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COMMUNICATIONS

THE INCIDENCE OF TRACHOMA IN THE SOUTHERN HIGHLANDS PROVINCE OF TANGANYIKA*

BY

HOWARD REED

MEDICAL OFFICER, TANGANYIKA

Introduction

IN an earlier paper[1] I drew attention to the importance of trachoma in connection with the schemes for educating Africans that were then under discussion. In that paper I emphasized its importance as a cause of defective vision and endeavoured to collect the available information concerning the incidence of this disease in East Africa, but I found that few statistics were available. A group of 1,000 African school children in the Kampala district of Uganda had been examined by Stones[2] and he found that 13 per cent. were infected. Harley-Mason very kindly sent me his statistics dealing with the attendances at the Nairobi Eye Clinic in the years 1941, 1942 and 1943 which showed that 15 per cent. of the 9,836 Africans seen during this period had the disease. When I wrote the paper in 1944 these were the only figures dealing with the incidence of trachoma that I was able to obtain.

In this paper I wish to record the results of a brief survey of the Southern Highlands Province in Tanganyika which was carried out intermittently as time permitted during the later months of 1945. Most of the work was done in my own district, Iringa, but I was able to examine the children in a few schools in Chunya, Tukuyu

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and Mbeya districts. It is hoped that this survey will give some indication of the incidence of trachoma in the Southern Highlands Province and assist further investigation into the problem.

The Southern Highlands Province

The situation of the Southern Highlands Province and the places visited are shown on the accompanying map. The province as a whole is at an altitude of between 5,000 and 6,000 feet above sea

level. All the schools I visited were situated within this range with the exception of Malangali which is at a lower altitude. The climate varies considerably in different areas of the province, but with the exception of Igali and Rungwe which are moderately cold and have a high rainfall, all the places visited in this survey have similar climates, with hot noon temperatures, cool evenings and a yearly rainfall of about 30 inches, all of which falls between November and the following April.

The area and population of the various districts in the Province can be seen from the following table :—

District	Area in Square Miles	Africans	Head of Cattle
Mbeya ...	11,043	125,000	165,801
Iringa ...	14,057	105,000	188,207
Rungwe ...	1,885	155,000	91,567
Njombe ...	7,996	130,000	92,006
Chunya ...	11,063	29,000	12,083
	46,044	544,000	549,664

The great differences in density of population are obvious; for example, in Rungwe district there are 81·5 people to the square mile, whilst in Chunya district there are only 2·6 people to the square mile. This, of course, reflects the fertility of the district and in the two cases cited Rungwe is naturally very fertile whilst Chunya is barren. It follows that the Wanyakusa tribe of Rungwe eat a good mixed diet and are a healthy tribe. It will be seen that this tribe showed the lowest incidence of trachoma and it may be that their good mixed diet is a factor of some importance in that it increases their general resistance to disease.

For six months of the year there is no rain in most districts so that water is scarce, the dry winds raise clouds of dust and the natives wash infrequently. In Rungwe, however, there is always water, there is little or no dust and the Wanyakusa are cleaner in their habits, dress and persons than the inhabitants of the other districts. Trachoma is a disease which is certainly favoured by dirty habits so the shortage of water during the dry season would appear to have some bearing on its prevalence.

In most districts in the province cattle-herding is the chief occupation. Almost as soon as an African boy is able to run about he spends his day watching the cattle. This is probably of some importance in connection with trachoma because wherever cattle are found flies are common and one has only to see them clustering undisturbed about the discharging eyes of African babies to realise how flies assist the spread of the disease. The district of Rungwe is an exception in that here agriculture is as important if not more important than cattle raising. The head of cattle in comparison to population can be seen in the foregoing table; for example in Iringa district there are 1·8 cattle per person and in Rungwe only 0·6 cattle per person. Furthermore, in many parts of Rungwe district the coffee and tea plantations are supplied by the Africans with cattle dung for manure and so the breeding grounds for flies are reduced. Whatever the causes, the numbers of flies appear to be less in Rungwe district than in most other districts in the Southern Highlands Province.

Diagnosis

During this survey I used for examination a corneal loupe and a hand slit-lamp connected to a car battery. My procedure was to examine the cornea and the lower fornix and then evert the upper lid and examine the upper fornix of each eye in turn. All cases were classified according to MacCallan's classification[3] as follows:—

TR I Subepithelial lymphocytic infiltration with or without lymphoid follicles.

TR II The stage of complication with the development of conjunctival blebs or papillary hypertrophy.

TR III The onset of scarring and the absorption of lymphocytic infiltration.

TR IV Complete cicatrization with no apparent inflammation.

MacCallan considers that the presence of pannus is pathognomonic of trachoma but since some difference of opinion appears to exist in East Africa concerning the criteria on which to base the diagnosis I have followed the example of other writers and have classified as "doubtful trachoma" those cases in which there was pannus only and no other apparent sign. In my opinion, however, these were definitely cases of trachoma, and, had a slit-lamp and corneal microscope been available, I believe the majority of them would have shown certain signs of being so. All cases classified as positive therefore, showed, in addition to pannus, lymphoid follicles, hypertrophied conjunctiva, Herbert's pits, Arlt's line, corneal facets or other unequivocal indications of the presence of trachoma.

Graham Scott[4] found a considerable number of cases in which pannus was the only indication of trachoma. He also classified

these cases as "doubtful trachoma" and stated that he considered that these cases represented "TR IV or stage IV of a mild infection which has healed without complications." This would certainly seem to be the case because almost all African children of one or two years of age who have the disease show a marked conjunctival reaction with numerous follicles, whilst the majority of African children a few years older show pannus as the chief sign and the conjunctival reaction is much less marked. This surely indicates that a few years after the onset of the infection the conjunctival inflammation tends to resolve leaving the pannus as the most obvious sign of trachoma.

Place	Total	Negative	Doubtful	Positive	Marked	Percentage Positive	Percentage Marked
Njombe (adult labourers)	71	47	6	18	2	25·3	2·8
Mbeya (children) ...	174	69	34	71	15	40·7	8·6
Chunya (children) ...	59	18	2	39	7	66·0	11·8
Igali (children)	180	100	23	57	12	31·7	6·7
Rungwe (children) ...	191	151	14	26	2	13·7	1·1
IRINGA DISTRICT							
Iringa (children)	104	20	12	72	16	69·2	15·3
Malangali and Utenguli (children)	535	221	87	227	19	42·4	3·5
Malangali (adults) ...	214	66	20	128	31	59·8	14·0
Tosamaganga (children)	1,092	300	134	658	215	60·2	19·6
Kalenga (children) ...	119	12	3	104	45	87·3	37·8
Kalenga (adults)	438	112	16	310	78	70·7	25·1
	3,177	1,116	351	1,710	442	53·8	13·9

Discussion

Duke-Elder[5] has stated that trachoma is rare among negroes, but Graham Scott has shown that from 5 per cent. to 25 per cent. of West African negroes are infected, the infection rate varying from district to district. On the whole the disease is of a mild type and disabling complications are not common.

In my series 3177 adults and children were examined and 1710

or 53·8 per cent. were found to be infected. All these Africans were members of the various Bantu tribes living in the Southern Highlands Province. These figures show that the disease is very common but it is mild in type, and frequently so mild as to give rise to no symptoms of discomfort. This comparative lack of symptoms probably explains why the disease has been considered rare amongst Africans.

The "marked" cases are those which were sufficiently severe to give rise to symptoms likely to trouble the patient or to complications that might lead to defective vision so that under this heading were included such cases as those in which the lids were thickened, the conjunctiva was hypertrophied and thrown into papillary folds or in which pannus threatened to involve the pupillary region of the cornea. Thus, of the 3177 only 442 or 13·9 per cent. ran any real danger of developing incapacitating complications.

Of the 438 adults examined at Kalenga 30, or 6·8 per cent. had such disabling lesions as leucomata, staphylomata and entropion in one or both eyes, conditions which were most probably the direct result of their trachoma, while of the 214 adults at Malangali 12 or 5·6 per cent. were similarly affected. Entropion occurred in nine of the cases at Kalenga and in two cases at Malangali. Almost all of these Africans were members of the Wahehe tribe whose chief occupation is cattle-herding and this tribe showed the highest incidence of all the tribes examined in this survey.

There is an apparent discrepancy at Malangali between infection rates of adults and children *viz:* 59·8 per cent. and 42·4 per cent. respectively. If the figures for marked cases are taken the difference is even more noticeable, 14 per cent. in adults and 3·5 per cent. in children. Malangali school is the chief African Government school for the whole of the province and is composed of some 384 children of whom about one half are boarders. In this report the 151 children from Utenguli Mission school a few miles away are included for convenience, bringing the numbers up to 535. All the boys in the upper classes of the Government school are picked students of about 18 to 20 years of age sent to Malangali from all parts of the province for special training. Examination of the figures for the school show that in 190 children in the lower classes, the majority of whom were day scholars, nine "marked" cases were found, whilst in 193 boys in the upper classes most of whom were boarders, only three "marked" cases were found. The percentages of "marked" cases are therefore as follows:—

Children:		
Lower forms	...	4·7 per cent.
Upper forms	...	1·5 „ „
Adults	...	14·0 „ „

These figures seem to indicate that:—

1. The natives of Malangali district have a high infection rate.

2. With the hygienic habits and good food which accompany boarding at Malangali school the disease tends to resolve.

3. Boys with trachoma sufficiently severe to cause symptoms find it a considerable handicap in their studies and drop out in the keen competition to be chosen for specialised training.

Bitôt's spots were seen in two boys at Utenguli Mission School, Malangali, and in one village schoolboy at Tosamaganga. These also showed some lack of lustre and wrinkling of the conjunctiva, but no other signs of vitamin A deficiency were observed. I should mention, however, that observations were confined solely to an external examination of the eyes and the children were not questioned as a routine concerning night-blindness.

Herbert's pits and corneal facets were seen quite frequently amongst adults and adolescents.

Effect of Climate

The climate does not appear to have much effect upon the incidence of the disease. Towards the end of the dry season in Iringa more Africans attended the hospital complaining of discharging eyes. Most of these, however, were cases in which a Koch-Weeks infection was superimposed upon trachoma. This, by causing a profuse muco-purulent discharge, would undoubtedly render a case of trachoma more infectious and assist in the spread of the disease.

The rainfalls of the various places visited are given below with the percentage of positive cases:—

Place	Average Yearly Rainfall in Inches	Percentage Positive
Rungwe ...	76·49	13·7
Chunya ...	31·67	66·0
Mbeya ...	35·87	40·7
Malangali ...	31·62	42·4
Tosamaganga	30·20	60·3
Iringa ...	30·42	69·2

Only in the case of Rungwe is there any marked difference in rainfall and a corresponding difference in the incidence of trachoma. Whilst this may appear to be suggestive these figures were examined statistically by Dr. A. D. Harris and no significant statistical correlation between rainfall and the incidence of trachoma could be found. This, however, is to be expected because the type of climate appears to have no marked effect upon the incidence of the disease in other countries.

Summary

1. Trachoma affects about 50 per cent. of the Africans of the Bantu tribes in the Southern Highlands Province of Tanganyika.

2. The incidence rate varies considerably from 13·7 per cent. in the Rungwe district to 87·3 per cent. in the neighbourhood of Kalenga.

3. Diet, dust, the personal habits of cleanliness, and the occupation of cattle raising and the associated swarms of flies are probably factors affecting the incidence rate.

4. On the whole the trachoma seen in the Southern Highlands Province is a mild disease.

I wish to record my gratitude to Dr. A. G. Mackay, Senior Medical Officer, Southern Highlands Province, for his encouragement and for assisting me by undertaking my duties whilst I visited the schools outside my district; to Mr. R. Stowell, Inspector of Schools, Malangali, and to Fathers Gerard and Sciolla of Tosamaganga Mission for much assistance.

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CORNEAL VASCULARISATION IN CHRONIC DISEASE

BY

P. A. GARDINER, Squadron Leader, R.A.F.V.R.

IT has been shown that corneal vascularisation is increased in disease and in trivial illness (Gardiner 1946). The same communication analysed a healthy group of people in terms of corneal vascularisation and trivial disease. The aim of the present paper is to analyse the manifestations of corneal vascularisation in a group of ill people and to discuss their significance.

Plan of Procedure

191 Service patients were examined with the slit-lamp. The following groups of cases were seen :—

		Numbers
Group i.	Proven duodenal ulcers	75
Group ii.	Rheumatoid arthritis and fibrositis ...	33
Group iii.	Other gastro-intestinal diseases	38
Group iv.	Miscellaneous; chiefly consisting of skin diseases and osteo-arthritis	45

In no case was there a double pathology and in every case the disease was sufficiently severe to warrant either admission to hospital or invaliding from the Service. About 33% of the total were in-patients and the remainder were examined as they were being invalided. In view of some of the results it is necessary to enlarge slightly on the types of disease which were seen. The duodenal ulcers were all confirmed radiologically. Group ii consisted of 16 cases of rheumatoid arthritis and 17 cases of fibrositis. Nearly all the latter had had recurrent attacks.

Of the 38 cases in Group iii, 18 had chronic diarrhoea as a predominating symptom and 8 of these could have been functional. The rest of the cases were all organic diseases of the alimentary tract apart from two severe cases of anorexia nervosa. In Group iv the biggest single sub-group was osteo-arthritis in 19 cases. There were 16 chronic skin lesions, 6 of these being eczematous dermatitis. The remaining 10 cases a miscellany of which 4 had chronic pulmonary diseases. The chief common factor in the whole series was the chronic nature of the disease though many individual cases had only had symptoms for a short time. Two control groups of healthy people were examined. 61 of these had had no illness of any kind even of a trivial nature for a mean period of about 12 months (Control 1). 105 had had trivial illnesses during the same

mean period such as occur in the majority of every population (Control 2). The results are expressed as the mean limbal score of the particular group or characteristic under consideration.

The following additional data were obtained in each case:—length of predominating or characteristic symptoms, food habits and ocular symptoms. The corneal vascularity was correlated with these findings.

Results

Disease— TABLE I

Correlation between disease and corneal vascularity

	Group i	Group ii	Group iii	Group iv	Control 1	Control 2
Number ...	75	33	38	45	61	105
Mean Limbal score ...	7·9	8·6	7·3	6·4	5·9	6·6

Statistically the difference between Groups i and iv is significant (S.E. ± 0·68; diff. =1·5) and also between Group ii and iv (S.E. ± 0·82; Diff. =2·2). The highest mean vascularity occurred in the fibro-arthritis group of diseases and in the duodenal ulcers. The least vascularity was in the most healthy group (Control 1) and Group iv was only slightly higher having about the same degree of vascularity as that which was found in Control 2.

Ocular Symptoms— TABLE II

Correlation of corneal vascularity and ocular symptoms

	Symptoms			No Symptoms		
	No.	per cent.	M.L. score	No.	per cent.	M.L. score
Control	24	13	8·5	161	87	6·0
Ill ...	45	24	8·3	146	76	7·3

The difference between the proportions complaining of symptoms in the control and the ill groups is significant (chi.^{2}=7; and (P) is less than 0·01). In the healthy group the S.E. of the difference between the mean limbal score of those with and without ocular symptoms is ± 0·85. This is just a third of the actual difference (2·5) and is therefore significant. In the ill group this difference is not significant.

It is interesting to note that the rheumatic group had a higher percentage with ocular symptoms than any of the others and also

that the nature of the symptoms was of a different order in the former group (Tables iii and iv).

TABLE III

Correlation between disease and incidence of ocular symptoms

	Examined	With Symptoms	Per Cent. With Symptoms
Group i	75	15	20
Group ii	33	12	36
Group iii	38	11	29
Group iv	45	8	18

Statistically these results are not significant.

TABLE IV

Correlation between disease and type of ocular symptoms

	Spots in Visual field	Watering	Redness	Gritty Sensation
Rheumatic Group ...	2	5	3	2
All others	11	5	5	2

There is therefore a higher proportion of subjects in the rheumatic group with watering of the eyes and a much lower proportion with spots in front of the eye. The majority of cases in the other groups were gastro-intestinal.

Food habits:—Each subject was directly asked whether he made a rigid practice of omitting from his diet any of the following:—meat, potatoes, green vegetables, milk, eggs, cheese. A dietary deficiency was only noted if it was absolute. (Table V).

The S.E. between the means in each group of deficiency was $\pm$ 1·34, the observed difference was 3·4. This is therefore considerably more than twice the standard error and therefore significant. The table shows that these people who did not eat meat, potatoes or eggs or any combination of these foods had a significantly higher degree of corneal vascularity than those who did not eat greens, milk or cheese, singly or in combination. Statistically the difference between those who ate a full diet and those who omitted meat, potatoes, and eggs was bordering on significance.

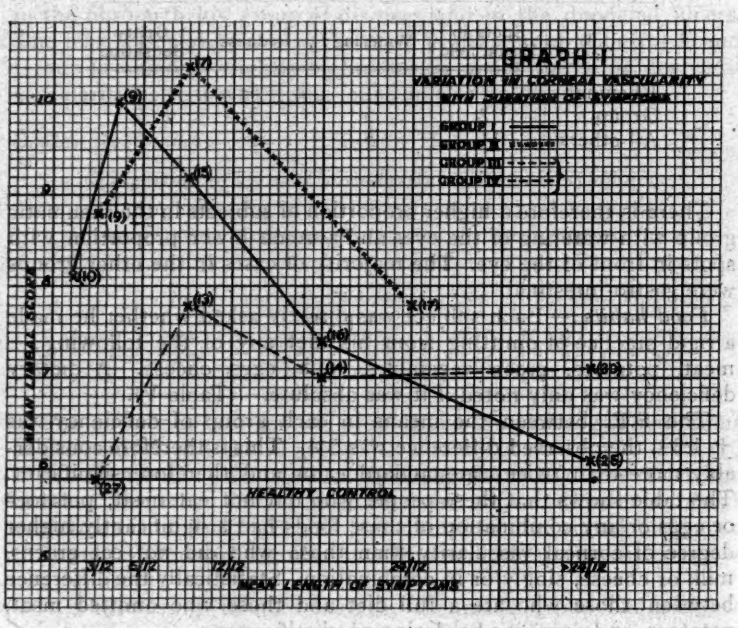
TABLE V

Correlation of dietary deficiency with corneal vascularity

	Nature of deficiency		
	Meat Potatoes Eggs	Greens Milk Cheese	Full Diet
Number ...	12	22	127
Mean Limbal Score ...	10·1	6·7	7·5

Length of symptoms:—Graph I shows the correlation between corneal vascularity and the length of time that symptoms had persisted.

Groups III and IV are shown in a common curve.



A line has been drawn at the level of vascularity shown by Control 1. All groups show that a peak of vascularity is reached and that its level falls after a certain period but this peak is much higher in Groups I and II and the rise occurs earlier in the disease. In the miscellaneous group the mean vascularity three months after the onset of symptoms is no higher than in the control group.

Discussion

Increase of vascularity in disease:—In view of the known appearance of corneal vascularisation in deficiency diseases and in states of sub-optimal nutrition, it would be expected that certain chronic diseases would also show increased vascularity of the cornea, especially those more intimately connected with metabolism such as gastro-intestinal disorders. The results shown in Table I justify this expectation strikingly, though not without raising some problems at the same time. There is a notable rise in the limbal score as the groups examined are the positively healthy (Control 1) casual sick (Control 2) suffer from mild chronic disease (Group III and IV) and then from more severe disease such as rheumatoid arthritis and duodenal ulceration (Groups I and II). To some extent at least those results show that the more severe the disease the more vascular the cornea. There are, however, too many exceptions to make this statement dogmatically, particularly if it is applied to the individual case; but over a series it is a fact of significance. The most difficult question arising from Table I is why rheumatoid arthritis and fibrositis which are not obviously metabolic or deficiency diseases, should show a higher degree of vascularity than any other of the diseases, particularly duodenal ulceration or the other gastro-intestinal diseases. Broadly speaking there are two possible explanations of the increased corneal vascularity in rheumatoid arthritis and fibrositis. First, these conditions may be due to or accompanied by vitamin, nutritional, or metabolic disorder of some severity, or secondly, the vascularisation may be a specific process similar to that which occurs in these diseases in other relatively avascular tissues, such as fibrous tissue and synovial membrane.

Although the latter possibility cannot be ruled out the former seems more probable. The vascularisation which occurs in the cornea is not so gross as that which occurs in synovial membrane, nor does it differ in nature from the type of vascularisation known to occur in states of nutritional deficiency. It is unlike the vascularisation which occurs in primary diseases of the cornea. Whether the difference in symptoms has any bearing on this point, it is difficult to say. The results show that in rheumatoid arthritis and fibrositis, watering, redness and gritty sensations in the eye, seem to occur more frequently than in the other diseases but as will

be discussed later these symptoms are probably symptoms of excessive vascularisation and as the latter occurs more frequently in this group it is natural to find the symptoms more prominent.

A condition has been recognised for many years, that of gouty-arthritic conjunctivitis (Duke-Elder Vol. II) which is a sterile or mucous conjunctivitis occurring in gout and arthritis. The condition found in the subjects under review, however, although often presenting similar symptoms, is occasionally symptomless and usually unassociated with any conjunctivitis. In fact the latter was not noticed once. Possibly an early stage of the conjunctivitis described is what has been found and a specific vascularisation may be associated with it. The whole subject is too big to discuss any more fully here and more intensive study will be needed to elucidate the point.

The correlation between the length of symptoms and the degree of vascularity is not easy to explain (Graph 1). An analysis of the subjects who were invalided shows that the majority went out of the Service when symptoms had lasted between six and twelve months. This suggests that few of the more severe cases of incapacity are to be found in the Service with symptoms of longer duration than this, and therefore the falling off in the degree of vascularity shown in all the groups is possibly due to less severe cases coming for examination and not to any real alteration as time goes on. A truly unselected group would have to be examined to establish this point, or alternatively the same cases followed up for two or three years.

Apart from the general higher level of vascularity shown in those suffering from duodenal ulcers and rheumatoid arthritis, it is a marked feature of the graph that these groups show a much more rapid increase in corneal vascularisation than the others. This rapid rise occurring in the first four months of the illness may only be apparent. The results of a previous investigation show that there is a possibility at least that the vascularity may have been raised before symptoms started (Gardiner 1946), in fact that an increase in corneal vascularisation is an early sign of disease. As this phenomenon is not found in the miscellaneous group there may be some underlying significance in the presence or absence of corneal vascularisation in relation to differential diagnoses. There is not sufficient evidence yet to clear up this point.

Aetiology and Symptomatology of corneal vascularisation:—It is only proposed to discuss the aetiology and symptomatology in so far as the present results have any bearing on them. The association with disease has just been dealt with. That corneal vascularisation also depends on nutrition has been abundantly proved (Sydenstricker *et al.* 1940; Lyle *et al.* 1944). It has not been possible to correlate the presence of the sign with the absence of any particular article of diet in healthy people and it has been disproved that it is a specific sign of riboflavin deficiency (Lyle *et al.* 1944). Among the group of

ill people here examined, however, there is a significant association between the presence of the sign and the absence in the diet of meat, potatoes or eggs singly or in combination. This association is not present when green vegetables, milk or cheese are missing.

This result is in conflict with the evidence collected about healthy people, but it is not incompatible in that under certain conditions of disease not necessarily primarily due to nutritional or vitamin deficiency, there is an abnormal demand for, or a deficient absorption of specific food elements as for example ascorbic acid in wound healing and vitamin K in obstructive jaundice. If this is agreed it follows that there might be a more definite correlation between corneal vascularisation and the absence of specific nutrients from the diet in disease than in health, without implying that the condition in either state is due to a nutritional deficiency, originally. The result does, however, help to maintain the general position that nutritional causes are operative in the aetiology of corneal vascularisation.

Corneal vascularisation often occurs without symptoms. However, the associations found in the present investigation between ocular symptoms and increased vascularity (Table iii) and the preponderance of symptoms of lacrimation in rheumatoid arthritis (Table v) does suggest that there are definite symptoms which occur when the condition is very marked. An analysis of the 36 cases with symptoms, seen both in the healthy and ill groups shows that these subjects complaining of watering, redness and grittiness of the eye singly or in combination had the high mean limbal score of 9·2. These symptoms are therefore strongly associated with corneal vascularisation especially when it is borne in mind that there were no cases of frank conjunctivitis. In order not to over stress this it must be noted that 11 with these symptoms out of 191 ill subjects had no excessive vascularisation and one with very marked vascularisation had no symptoms.

Corneal vascularisation as a health index:—Corneal vascularisation is at present used in surveys as an index of the nutritional well being of any group of subjects. It is a useful and accurate sign on which to base comparative estimations. However, the present investigation shows that to draw hard and fast conclusions about nutrition on the basis of altered corneal vascularisation might conceivably be misleading, as this sign also varies in degree in disease. Its use then for nutritional surveys should be confined to healthy people. Moreover it is desirable also to exclude subjects who have had any disease however trivial in the three months before the examination as these may alter the vascularity of the cornea (Gardiner 1946). In practice this exclusion need not be too rigid because a faulty nutrition predisposes to disease and therefore the results probably overlap, but it would be possible to blame nutrition for corneal changes in a

group of people which in fact might have synchronised with a recent epidemic of some trifling illness. If this is borne in mind the use of this sign could be of considerable value as an index of health in its broadest sense.

The sign may well prove to be of use also in differential diagnosis or prognosis in disease when its significance has been still more clearly defined. Rheumatism, particularly backache for example, is frequently of functional origin. Fibrositis and infective arthritis however, are also commonly associated with this symptom and the differential diagnosis is sometimes difficult. The presence of corneal vascularisation might be indicative of an organic condition though of course not pathognomonic, nor would its absence be a certain index of a functional condition.

Conclusions

Corneal vascularisation is more frequently present and is of a higher degree in more severe disease than in less severe disease.

Corneal vascularisation is more pronounced in duodenal ulceration and rheumatoid arthritis than in other gastro-intestinal disease, osteo-arthritis and various other diseases.

In disease there is more corneal vascularisation amongst those who complain of ocular symptoms than amongst those with no ocular symptoms.

Lacrimation, grittiness in the eyes and conjunctival congestion accompany corneal vascularisation more often than other symptoms, though vascularisation does occur without any symptoms.

In surveys for comparative health, only healthy subjects should be examined if conclusions are to be drawn about their nutrition.

The presence of corneal vascularisation may prove to be of considerable value in the differential diagnosis of diseases with functional imitations.

Summary

The variation in corneal vascularity has been examined and discussed in relation to various general diseases, notably duodenal ulceration, rheumatoid arthritis, gastro-intestinal diseases and others.

The local symptoms of corneal vascularisation and its value as an index of health have been discussed. Its possible use in differential diagnosis between functional and organic disease has been indicated.

Acknowledgments

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IRIDENCLEISIS—A MODIFICATION*

BY

D. PRIESTLEY SMITH

BIRMINGHAM

THREE months ago a woman of 80 came to see me. Both eyes were hard and both lenses opaque. One eye was stone blind, but the other had fairly good projection, and she chose to face cataract surgery on this eye, though realising that the risks were high.

One had, of course, to relieve the glaucoma first; and this meant making a filtering scar that would not be deranged by the subsequent cataract wound. One way would have been to do the glaucoma operation below the cornea; but in that situation it is permanently more exposed to infection. So I decided on iridencleisis above the cornea as usual, but further still from the limbus if possible: and the question arose how to minimise the difficulty of striking the angle of the anterior chamber from so far away.

The procedure which I adopted was as follows. First, I lowered the vitreous pressure by a scleral puncture with a Graefe knife 45 degrees to the temporal side of the vertical meridian and 6 mm. from the limbus. This is my usual first step in glaucoma operations. Next, with a rather narrow parallel-sided keratome, I made an incision as for an ordinary preliminary iridectomy, but entering the sclera about 5 mm. above the limbus. With an iris hook I then pulled a loop of iris into one angle of the wound and snipped off the tip of the prolapse flush with the surface. By stroking the wound from the opposite end I freed one pillar of the loop so that it slipped back into the anterior chamber, leaving the other incarcerated. I do this as a routine in iridencleisis, to reduce the amount of iris tissue left in the wound, one pillar being enough in my experience.

The iris inclusion had now to be provided with a proper covering of conjunctiva. I made a scissor-cut through the conjunctiva parallel with (and rather longer than) the keratome wound and about 5 mm. above it, and tunnelled under the strip of conjunctiva

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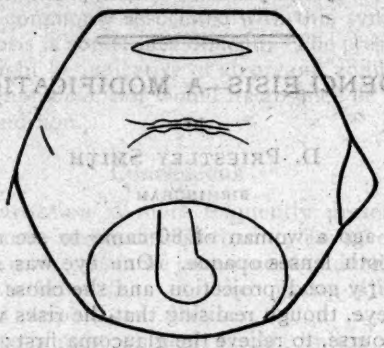
lying between the two. With two pairs of fine forceps I then picked up the lips of the conjunctiva over the keratome incision and pinched them together, hoping that they would adhere, which they did, the elastic pull from above having been abolished by the scissor-cut. This cut served another purpose also: it provided a temporary outlet for the aqueous, so that the lower conjunctival wound was not forced open again, but had time to unite.



Iridencleisis completed. To the outer side, the scleral puncture (slit in conjunctiva not shown). In the middle, the conjunctiva pinched together over the scleral incision and iris inclusion. Above, the relief-cut in the conjunctiva.

The scar filtered well, lowering the tension nicely, and in a few weeks I extracted the cataract, somewhat hampered by two inconveniences. The previous operation had warned one of the first, namely, that the sclera was very tough, as it so commonly is in eyes with glaucoma of long standing. The second is, fortunately, not so common; as I was, with difficulty, making my counter-puncture, fate decided that this was the moment for the patient to be seized with cramp in the leg. It gave everyone a bad forty-five seconds, but her great self-control prevented it from wrecking the eye. I cut out at the limbus, foregoing a conjunctival flap, so as to give the filtering scar a wide berth, opened the capsule with forceps and expressed the lens.

Recovery was uneventful. The redness lasted rather long, but at the time of writing, four weeks after the extraction, it has nearly all gone, the filtration has not been upset, the tension keeps normal (to palpation) and the corrected vision is 5/8. (Vitreous haze. Disc cupped).

The above method of performing iridencleisis enables one to make the scleral incision through undisturbed conjunctiva instead of under a fold. This lessens the difficulty of directing the knife accurately, and so allows one to introduce it well back from the limbus without undue risk. This consideration comes to the fore especially when one contemplates subsequent extraction of cataract; but it applies also in ordinary cases of glaucoma. And the procedure is simple.

SULPHONAMIDES AND PENICILLIN IN THE TREATMENT OF TRACHOMA*

BY

F. S. LAVERY

DUBLIN

THERE has been considerable controversy as to whether or not sulphonamides have a specific effect on the virus of trachoma. The answer to the question has importance not only for the correct treatment of the disease, but it also has importance as an aid in the classification of the group of morphologically indistinguishable viruses to which that of trachoma belongs. The extensive literature on the subject has been reviewed so often that it would only be tedious if I were to do so again in this communication. Sufficient be it for me to say that of the numbers who have written on the subject a substantial majority has claimed a specific effect for sulphonamides upon the virus. Most of the protagonists of sulphonamides have depended upon clinical observation. This in a disease whose end-point is so ill-defined, and in which the stage at which it ceases to be infectious is largely a matter of conjecture. Some have submitted sulphonamides to the more critical test of examining smears of conjunctival scrapings for the presence or absence of the specific inclusion bodies before and after the course of treatment. The sulphonamide most extensively used has been sulphanilamide administered internally.

Thygeson[1] claims that in cases in which specific inclusion bodies were found previous to the internal administration of sulphanilamide they could not be found afterwards. In this series of 31 cases of trachoma he found inclusion bodies in 16 (51·5 per cent.) before the commencement of sulphanilamide therapy. This is a high percentage of positives and is still the more remarkable in so much as 8 of the 16 cases are listed as being in either stage 3 or stage 2—3. The percentage of positives in the series of 54 cases of trachoma hereafter to be reported on was 33·3, and 53 per cent. of these were stage 1. Julianelle[2] in a series of 602 cases found that 32·7 per cent showed the presence of specific cell inclusions, and in an analysis by him of forty-two reports from various countries in which a grand total of 5,777 patients was recorded the percentage of positives was 30·8. Thygeson reports that in all the 16 cases which were positive cell inclusions could not be found after so short a period as three days' treatment with sulphanilamide. In spite of this finding only 10 per cent. of the 16 cases are recorded as being "healed." He found that sulphanilamide therapy had no effect on secondary infection,

* Received for publication, July 26, 1946.

and that in three cases of acute trachoma with discharge the conjunctival flora was normal, both before and after the treatment. In a subsequent series[3] of 70 cases of trachoma (this series includes the above-mentioned 31 cases) he again reports favourably on the specific effect of sulphanilamide therapy; but he does not state the number of cases in which the cell inclusions were found before the commencement of treatment. MacCallan[4] reports that after treating cases of trachoma with sulphapyridine he was able to identify specific cell inclusions.

There have been very few claims that penicillin has a specific effect on the virus of trachoma. Sorsby[5] reports on the treatment of three cases with penicillin. In one of these inclusion bodies were present in epithelial scrapings before the commencement of treatment. The case is of little use for the evaluation of the therapeutic efficacy of penicillin as treatment was commenced by an expression. The penicillin was used in a concentration of 2,500 units per c.c. painted on the tarsal conjunctiva once per day. He does not state whether or not a search was made for inclusion bodies at the conclusion of treatment. He reports clinical cure of the case.

To date there appears to be general agreement that penicillin is only likely to be effective if administered locally.

The type of trachoma met with in and around Dublin is usually a less vigorous disease than that with which I was accustomed to deal when I first commenced to specialise in ophthalmology in 1927. One rarely comes across a fresh case which is complicated by sufficient pannus formation to interfere materially with vision. The disease most often manifests itself by the presence of follicles on the conjunctiva of the upper fornix and along the upper edge of the superior tarsal plate. Were it not for the finding of typical inclusion bodies the diagnosis in many cases would be doubtful. It is striking that on more than one occasion when they have not been found in the conjunctival scrapings taken from an obviously infected member of a family they have been found in the scrapings from a clinically less obviously infected brother or sister.

Most of this series of 54 cases of trachoma have already been reported on (6) from the point of view of the aetiology of trachoma in Ireland. They are now to be analysed in so far as the result of treatment of some of them with sulphonamides and penicillin might be of aid in the evaluation of the therapeutic effects of these drugs. The sulphonamide therapy employed was: internally the patients were given gr. 1/3 per lb. body weight of sulphanilamide in the 24 hours, accompanied by sufficient sod. bicarb. to combat nausea. The drug was divided into three equal daily

doses. This was given for two weeks, and then half this quantity for a further week. Locally, during the full three weeks' period sol. sod. sulphacetamide 10 per cent. was instilled into the conjunctival sacs every three hours during the day, and last thing at night ung. sulphacetamide 6 per cent. was inserted into the conjunctival sacs.

In the cases selected for penicillin therapy the drug was administered locally in the form of drops, 2,500 units per c.c. The drops were instilled into the conjunctival sacs every two hours during the 24 hours for a period of two weeks, and in addition, in cases Nos. 11 and 12 swabs soaked in the solution were inserted into the upper fornices for five minutes once per day.

In 18 of the 54 cases specific inclusion bodies were found. A number of the series were treated with sulphonamides and a lesser number with penicillin. Only cases in which inclusion bodies were found, either before or after treatment, are dealt with in this communication. It is appreciated that the inclusion of cases which were negative before treatment but were positive after treatment, while representing a true finding, is a weighing factor against the therapeutic value of sulphonamides or penicillin being established. It is felt that this weighing factor is more than counterbalanced by the difficulty in finding inclusion bodies in conjunctival scrapings. While the identification of specific cell inclusions can be accepted as a positive result, failure to find them even after a long search is very far from proving the reverse.

Data concerning the cases treated with sulphonamides is set out in Table I, and that concerning the cases treated with penicillin in Table II.

TABLE I

Case No.	Sex	Age	Stage of Disease	Inclusion Bodies	
				Before Treatment	After Treatment
1	F	11	Two	Present	Present
2	F	14	One	Present	Present
3	F	22	Two	Present	Absent
4	F	9	One	Present	Absent
5	M	34	Two	Present	Absent
6	F	8	Two	Absent	Present
7	F	10	One	Present	Absent
8	M	11	One	Present	Absent

Data on cases treated with sulphonamide internally and sod. sulphacetamide locally.

TABLE II

Case No.	Sex	Age	Stage of Disease	Inclusion Bodies	
				Before Treatment	After Treatment
1	F	11	Two	Present	Present
9	F	16	One	Present	Absent
10	M	15	Twe	Present	Present
11	F	12	Two	Absent	Present
12	F	8	Two	Absent	Present

Data on cases treated with penicillin locally.

Case No. 1 is of interest as it is the only one reported on which was treated with both penicillin and sulphonamides. Inclusion bodies were found before the commencement of any treatment in February, 1945. After two weeks' treatment with penicillin they were again found. In December of the same year conjunctival scrapings were still positive; and they remained positive after sulphonamide therapy.

In Case No. 10 penicillin drops were instilled only into the right conjunctival sac, the left being kept as a control. After the conclusion of the course both eyes yielded positive results. When examined recently, after a lapse of ten months, the right eye presented the clinical appearance of a cure, while the disease is active in the left. The patient was on spasmodic classical trachoma treatment in the interval.

While the number of cases submitted is too small to draw definite conclusions from, it is of importance that in three cases inclusion bodies were identified after carefully controlled sulphonamide therapy. On the other hand, the five negative results in eight cases after the conclusion of sulphonamide therapy against the one negative result out of five cases treated with penicillin, could hardly be fortuitous.

I have to express my thanks to the Medical Research Council of Ireland for a grant-in-aid, and to Dr. P. N. Meenan for carrying out the pathological work connected with this communication.

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BILATERAL DETACHMENT OF THE CHOROID OF UNUSUAL DURATION FOLLOWING CORNEO-SCLERAL TREPHINE*

BY

A. E. P. PARKER

MIDDLESBOROUGH

DETACHMENT of the choroid following trephining for glaucoma occurs sufficiently often to make it a matter of some importance to ophthalmic surgeons, and any addition to our knowledge of the condition would appear to be of value and to warrant putting the following case on record.

Mrs. C., aged 56 years, consulted me first on August 9, 1943, complaining of defective vision of some months duration.

She gave a lengthy history of bad health of staggering complexity and was obviously suffering from myxoedema which it transpired had been overlooked by her medical attendant, but what part this plays in her glaucoma and other ocular troubles I will not venture to say. Vision in the right eye was, with correction, 6/18 and 6/12 in the left. The discs were deeply cupped, the tension one plus, and the fields showed considerable contraction. Figs. 1 and 2.

She was put on miotic treatment and also the myxoedema attended to with great improvement to her general health, the vision improved to 6/6 in each eye, the fields improved slightly and the tension on each occasion it was taken was in the region of only 30 mm. Schiötz.

By January, 1944, in spite of good miosis and a not unduly high tonometer reading, both fields were obviously shrinking, and with the concurrence of Mr. Arkle, of Newcastle, operation was advised.

The right eye was trephined by the classical method on February 19, 1944. The iridectomy was a small complete one, and the flap sutured with a continuous suture.

The anterior chamber reformed in a day or two but was very shallow, and the tension low, and a few days after the operation a typical choroidal detachment was visible in the upper nasal quadrant. As one had seen this often enough before no particular anxiety was felt, but as the weeks and months passed and it changed but little some disquiet was inevitable. A careful search was made for a leak in the flap and over the trephine hole, but the

* Received for publication, March 7, 1945.

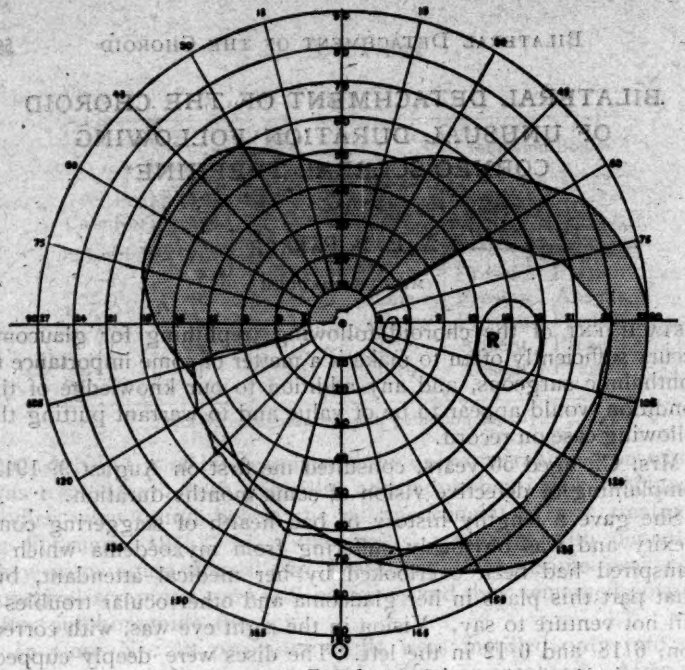

FIG. 1.

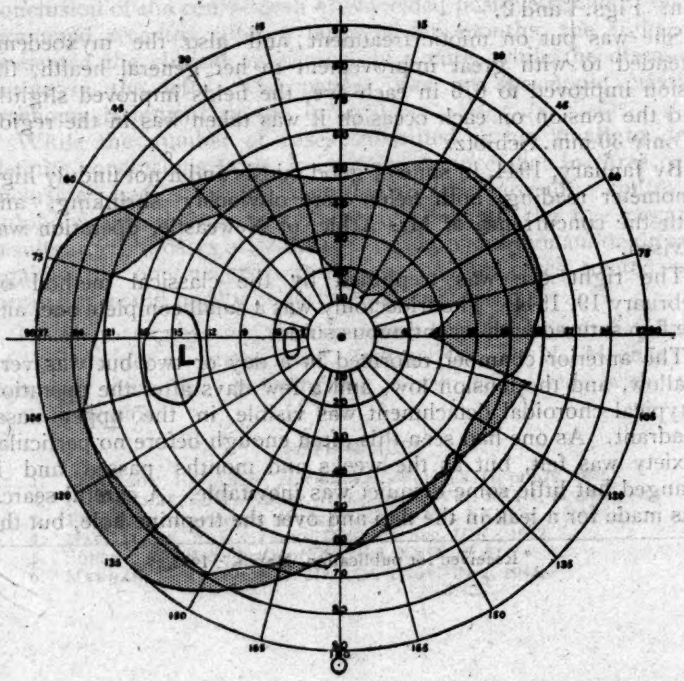

FIG. 2.
Fields before operation, August, 1943.

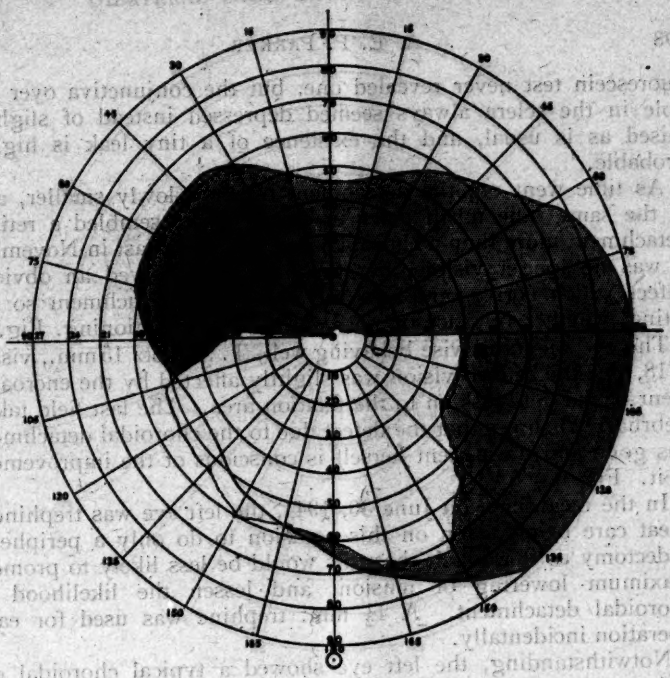

FIG. 3.

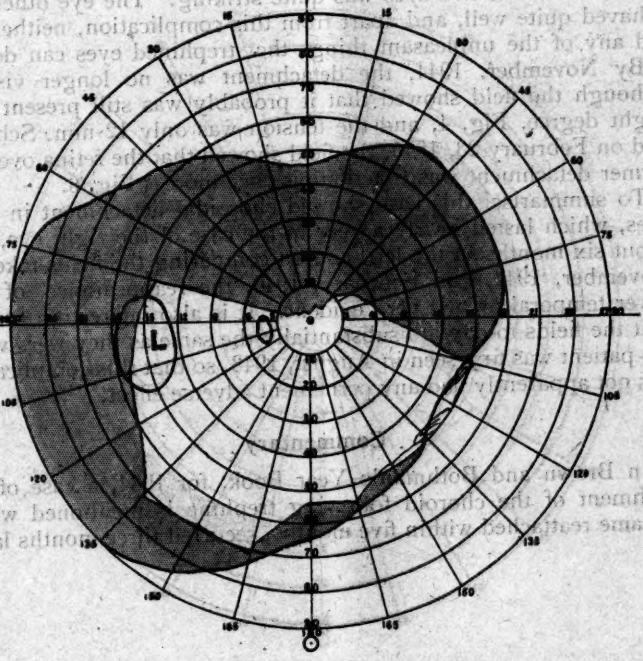

FIG. 4.

Fields taken with choroidal detachment apparently back in place, November, 1944.

fluorescein test never revealed one, but the conjunctiva over the hole in the sclera always seemed depressed instead of slightly raised as is usual, and the existence of a tiny leak is highly probable.

As time went on, the detachment became slowly smaller, and at the same time much paler in colour and resembled a retinal detachment more than a choroidal one. At long last in November it was no longer visible, but the field still showed an obvious defect which corresponded to the site of the detachment so the retina, whether in place or not, was not yet functioning. Fig. 3.

The eye was otherwise behaving well, T. Schiötz 15 mm., vision 6/18, but the central vision was slightly affected by the encroachment of the field-loss on to the fixation area. The last field taken February 23 shows that the defect due to the choroidal detachment has gone and the patient herself is conscious of the improvement in it. Fig. 5.

In the meantime, on June 30, 1944, the left eye was trephined, great care being taken on this occasion to do only a peripheral iridectomy as it was felt that this would be less likely to promote maximum lowering of tension, and lessen the likelihood of choroidal detachment. A 1½ mm. trephine was used for each operation incidentally.

Notwithstanding, the left eye showed a typical choroidal detachment, again in the upper nasal quadrant, and the symmetry of the lesion in the two eyes was quite striking. The eye otherwise behaved quite well, and apart from this complication, neither eye did any of the unpleasant things that trephined eyes can do.

By November, 1944, the detachment was no longer visible, although the field showed that it probably was still present to a slight degree, Fig. 4, and the tension was only 12 mm. Schiötz, and on February 23, 1945, the field showed that the retina over the former detachment was functioning once more. Fig. 6.

To summarise, this case showed choroidal detachment in both eyes, which lasted nearly a year in the case of the right eye, and about six months in the left, and on comparing the fields taken in November, 1944, and February, 1945, the reappearance of the lower temporal area is very evident. It is also interesting to note that the fields to-day are substantially the same as they were when the patient was first seen in August, 1943, so that this complication has not apparently had any permanent adverse effect.

Commentary

In Brown and Bothman's Year Book, for 1934, a case of detachment of the choroid following trephine is mentioned which became reattached within five months, recurred three months later,

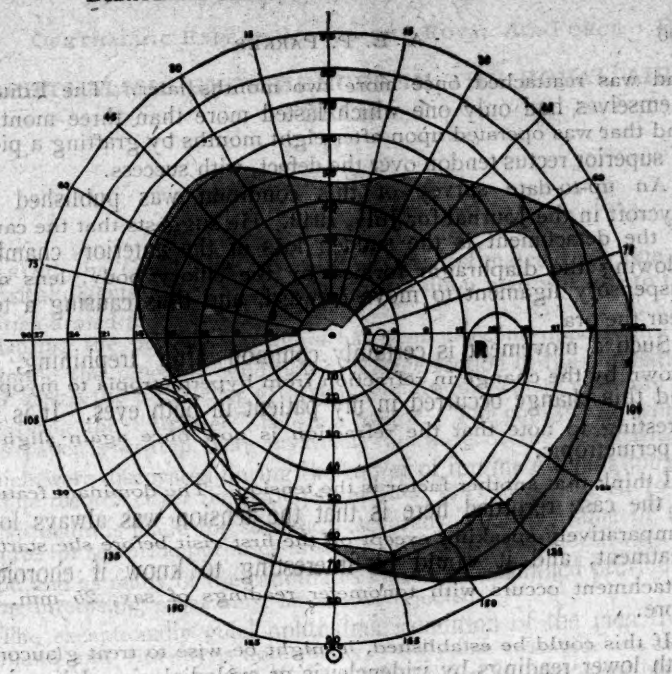

FIG. 5.

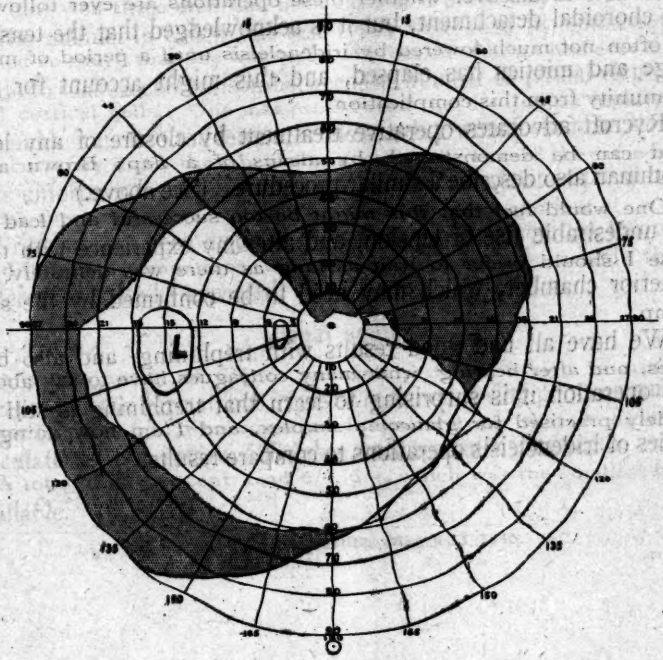

FIG. 6.

Fields showing gain due to reattachment of choroids, February, 1945.

and was reattached once more two months later. The Editors themselves had only one which lasted more than three months, and that was operated upon after eight months by grafting a piece of superior rectus tendon over the defect, with success.

An up-to-date survey of this condition was published by Rycroft in the Journal for July, 1943. He suggests that the cause of the detachment is the sudden loss of the anterior chamber allowing the diaphragm formed by the ciliary body, lens and suspensory ligament to move forward, and thus causing a tear near the ora.

Such a movement is certainly common after trephining, as shown by the change in refraction from hypermetropia to myopia, and this change occurred in my patient in both eyes. It is interesting to note that the refraction is now once again slightly hypermetropic.

I think that another factor is the tension. The dominant feature of the case recorded here is that the tension was always low, comparatively speaking except on the first visit before she started treatment, and it would be interesting to know if choroidal detachment occurs with tonometer readings of say, 25 mm. or more.

If this could be established, it might be wise to treat glaucoma with lower readings by iridencleisis or cyclodialysis. I have not been able to discover whether these operations are ever followed by choroidal detachment, but it is acknowledged that the tension is often not much lowered by iridencleisis until a period of massage and miotics has elapsed, and this might account for the immunity from this complication.

Rycroft advocates operative treatment by closure of any leak that can be demonstrated, by means of a flap; Brown and Bothman also describe a similar procedure. (See above.)

One would feel that this might be too successful and lead to an undesirable rise of tension, and after my experience with this case I should prefer to wait as long as there was definitely an anterior chamber, which may need to be confirmed by the slit-lamp.

We have all had good results with trephining, and also bad ones, and after hearing what many colleagues have to say about the operation it is surprising to learn that trephining is still so widely practised for glaucoma simplex, and I am now doing a series of iridencleisis operations to compare results.

OPHTHALMIC EXPERIENCES IN THE ROYAL AIR FORCE

BY

FRANK R. NEUBERT

LONDON

DURING the Great War, 1914-18, it was estimated that, due to physical defects, the service of over one million men was lost to the British armed forces.

During the present war there has been a second opportunity to examine the physical condition of a large section of the population and assess the prevalence of certain conditions which normally do not bring the "sufferer" before a doctor. The subjects on whom this paper is written were invariably unaware of the peculiarities, which were discovered during the course of routine examinations.

The records cover the period from June 1941 until August 1945.

No claim is made for statistical accuracy, and the value of the figures for scientific purposes is small. Records could not always be kept, and as many of the candidates had been examined previously some interesting cases must have been rejected.

The exceptionally good ophthalmic condition of the men from Holland and Norway is noteworthy. Only one volunteer was seen with defective colour vision (from Holland) but it is not possible to say how well these men had been examined previously.

The manner in which the test types were read by emmetropes varied so much that one wondered whether an attempt had ever been made to make a comparison between the number of retinal elements and cortical cells. One man would read the 6/4 line as rapidly as he could enunciate the letters, while another would stumble slowly but correctly down the whole chart, eventually to read the same line. It is unfortunate that the pressure of work made it impossible to check these responses with the man's intelligence quotient.

Criticism has been made of the different visual acuities recorded at different examinations, but as the conditions are variable these differences must be expected.

Visual acuity

A visual acuity of 6/6, is an average figure which is usually accepted as the normal, but it was so common to find pilots originally passed as 6/6, 6/6, who could read smaller type, that in order to calculate the percentage, 500 cases were specially examined.

A total of 71 per cent. read 6/4, 6/4, which was the smallest type available.

* Received for publication, March 13, 1946.

6/6	6/6	20	4·0	per cent.	approx.
6/6	6/5	18	3·5	„	„
6/6	6/4	8	1·5	„	„
6/5	6/5	58	12·0	„	„
6/5	6/4	39	8·0	„	„
6/4	6/4	357	71·0	„	„
		Total 500			

FIG. 1.

An American Medical Mission visiting the Board in 1941 stated that the average acuity of the fit young men of the U.S.A. was found to be nearer 20/15 (6/4·5) than 20/20 (6/6). (It is interesting to observe that the Americans, who use the metric system for most scientific measurements, still use English measures in optometry, while the contrary is used in this country).

Manifest hypermetropia

Many candidates have expressed dissatisfaction after having been assessed as "Unfit Air Crew (EYES)", when they know they have "always read down to the bottom line", and some have returned to ask what was wrong. It is not easy to convince them without divulging the principles of the examination, and although the test is described in ophthalmic text-books, it becomes useless when a candidate who wishes to pass, knows beforehand exactly what he is expected to see.

Some subjects are not troubled by even considerable amounts of hypermetropia but under such circumstances as overwork, worry, and strain, small amounts may produce considerable symtoms of asthenopia.

Pilots with more than 2·5 D. of manifest hypermetropia have flown over 1,000 hours without complaint and one of them had flown without trouble over 2,500 hours with 5 dioptres. Such men might be compared with another who had 1·25 dioptres. Following a period of considerable overwork his punctum proximum receded from 14 cms. to 22 cms. and he manifested a 2·5 dioptres of hypermetropia with marked symptoms including diplopia. This officer was no longer flying but spent two hours each week on a Link trainer and he soon noticed the difference with his eyes, especially when under the hood. Here the effort of accommodating for the instrument panel at approximately 2/3 metre without relief produced such intense strain that he invariably developed diplopia and fell asleep, the alteration in flying altitude immediately waking him with a start.

The feeling of utter exhaustion could be realised, perhaps, only by one so afflicted, but the danger to a pilot returning from a long and hazardous trip is demonstrated in no uncertain manner.

On several occasions pilots were examined after two tours of operations, and it was found some of them developed symptoms of asthenopia with approximately only one dioptre of manifest hypermetropia.

Out of a total of 21,622 candidates examined for air crew duties, 478 (2·21 per cent.) were rejected for manifest hypermetropia.

The Cover Test

The cover test is a simple procedure from which a considerable amount of information may be obtained. It is not uncommon to find cases whose near response is a large or moderate deviation with either "slow recovery" or even "no recovery" who are orthophoric for distance with no movement on the cover test. I have found the converse, but the condition is not common.

It would appear an advantage to repeat the cover test for "distance" when it is unsatisfactory for "near" or when there is heterophoria.

I have seen so many cases with unsatisfactory cover tests who were orthophoric for distance, that I wonder whether the desire for fusion may not, perhaps, be occasionally stimulated by the fixation of two such dissimilar objects as the Maddox rod and red light, and thus show no deviation when perhaps a slight imbalance does exist.

For two years, all these cases with doubtful cover tests were examined with the Worth's four dot test which I consider to be of the greatest value. Several cases possessing simultaneous binocular perception would have been placed in a higher category without the results of this test.

The Maddox test

This test was invariably beyond criticism and a more simple one could hardly be desired.

In a dimly lit room it was noticeable how much difficulty was found by some persons in seeing the red line and in most cases it was obvious that the ease with which it was seen bore a direct relationship to the man's apparent mental alertness.

Ocular muscle imbalance

Total cases	4231		8015
	6^{Δ} to 10^{Δ}	over 10^{Δ}	over 6^{Δ}
ESO ...	45	34	51
EXO ...	16	6	43
Hyper ...	1^{Δ} to 2^{Δ}	over 2^{Δ}	over 1^{Δ}
	5	5	37
Suppression		31 cases	

FIG. 2.

Strabismus. (Among 22,876 cases). (i) Internal 44. Internal alternating 10. (ii) External 26. External alternating 9. (iii) Vertical 25.

Other muscle abnormalities. (iv) Overaction. Right inferior oblique 2. Left inferior oblique with paresis of right superior rectus 1. (v) Paresis of individual muscle. Left inferior oblique 2. Third nerve (post meningitis) 1. Third nerve 1. Left superior rectus 1. (vi) Limitation. Congenital limitation of all ocular movements 3.

Torticollis. 43 cases were seen, three of whom had facial asymmetry, three vertical squint, and one ptosis.

In a series of 1,711 cases 52 cases were seen who had one eye higher than the other (27 cases right eye: 25 cases left eye) without either hyperphoria or torticollis.

It is worthy of note that the majority of candidates with an ocular torticollis had no demonstrable muscular imbalance although their eyes were of irregular height. In all cases the head was turned to elevate the higher eye.

Six cases of torticollis were seen which were not ocular in origin.

Restriction of movement. Three cases were seen with a marked limitation of all eye movements.

Ptosis. Eleven cases were seen with unilateral ptosis; Three cases were seen with bilateral ptosis. One with amblyopia. One with well marked arcus (age 17). One with facial palsy.

Nystagmus. PRIMARY. Horizontal 23. Vertical 1. Unilateral 1. SECONDARY 4.

Diplopia was found in four cases. One following ethmoid operation. One following ophthalmoplegia. One with choroidal dystrophy. Two with signs of disseminated sclerosis.

65 cases of amblyopia were recorded who had no muscular imbalance.

Bishop Harman test

The interpupillary distance was found to vary between 55 mms. and 75 mm., the average being about 64 mm.

The phorometer estimates the "desire for binocular vision" and is a dynamic and not a static test like the Maddox wing test.

The estimation is of considerable importance in cases of heterophoria and those showing an abnormal cover test.

(i) In candidates with weak convergence who are orthophoric for distance, exophoria of 5 to 10 is not unusual.

(ii) Many cases with poor convergence show an outward deviation of one eye (more frequently the left) and a monocular response anywhere between 20 and zero. This signifies a low amplitude of convergence with marked dominance of one eye, a fact usually shown by the response to the cover test.

Convergence

Before 1942, candidates whose convergence was between 10 and 20 cm. were given orthoptic training and out of 4,231 men examined 120 were sent for that treatment. The convergence of less than 20 cm. caused rejection for pilot training into which category twenty-nine were placed.

It was common to find candidates unable to converge more than 40 cm. who would upon repeated attempts gradually improve. It was not unusual to have one or two in the waiting room practising simple convergence exercises who were, after an hour or so, able to pass the required standard.

Convergence when once developed appears to remain indefinitely and I have records of one patient who, in 1925, was trained to overcome 65 prism dioptres, and 20 years later, was able to converge 60 degrees on the synoptophore.

Total Cases	4231		8015
Convergence ...	10 cm. to 20 cm.	Over 20 cm.	Over 10 cm.
	120	29	53
Approximate percentage ...	5	0·7	0·6

FIG. 3.

Accommodation

The method of estimating the punctum proximum by approaching a test card with the letters A L T (Jaeger 14) and asking when they become "blurred" or "no longer distinct" can only be considered an approximation.

Even an experienced observer finds some difficulty in deciding precisely when a letter is first blurred or knowing what degree of blurring is expected, and some candidates wait until the letters can no longer be deciphered.

It would appear more accurate to withdraw slowly from the eye (corrected if necessary), a Jaeger I test type, and to note the distance at which it can first be read.

Visual fields

The value of determining the size of the visual fields by hand movements as a routine is small. This was done in 5,000 cases wtihout finding any defects.

The test is considered to be too inadequate to demonstrate field changes of which the subject is unaware.

All cases with a history of trauma were examined with the perimeter and four defects were found.

A similar examination was performed in those pathological conditions which indicated it.

Colour vision

The colour vision of every candidate was tested with the Ishihara or the pseudo-isochromatic plates printed by the American Optical Company. Every candidate who made any error was examined with the Giles-Archer Colour Perception Unit on which his assessment was made.

A total of 40,295 men were seen, out of whom 1,152 (3 per cent.) were anomalous trichomats (colour defective safe), and 1,083 (2·5 per cent.) dichromats (colour defective unsafe).

An investigation of the defectives forms the substance of another paper.

A considerable number of patients were re-examined who had been rejected due to persistent errors such as landing "too high" or "too low" during their initial flying training, and several of these were found to have phorias. No records were kept.

On the other hand during the re-examination of experienced pilots for initial "B" licences and the renewal of "B" licences a number were found who were unfit to fly according to the standards and the results of 33 are given in detail.

An analysis shows the following defects:—Manifest hypermetropia 9; defective visual acuity 8; monocular for near vision 5; amblyopic in one eye 2; unsafe co'our vision 2; defective convergence 2; over-action of inferior oblique 2; external strabismus 1; alternating external strabismus 1; excessive exophoria 1. Total 33.

Fundi and media

All pathological conditions and congenital abnormalities were classified: 127 fundus drawings were made.

Permission was granted by Sir Harold Whittingham, D.G.M.S., R.A.F., for the publication of these excerpts from the report made at the end of the war on ophthalmic work in the Royal Air Force Volunteer Reserve.

SATTLER'S VEIL

BY

J. DALLOS

LONDON

IN my report to the Széchenyi Scientific Society in 1934 I gave a detailed account of experiments made with contact lenses fitted so as to correspond, or on the contrary to deviate systematically from casts taken from the eyeball. My conclusion at that time was that the best average tolerance, *i.e.*, the longest periods of wear without irritation or veiling, is reached when a lens fits firmly over large areas in the upper-inner and lower-outer quadrants, not with edges but surface to surface, and has apart from these primarily fitting areas a secondary touch, *i.e.*, contact without pressure, spreading over the middle of the cornea; the centre part of the lens should have a radius somewhat flatter than the cornea so that an air bubble can freely circulate around the limbus and escape in the lacrymal meridian (from up and out to down and in) which is made comparatively loose, thus allowing a certain amount of "breathing."

I emphasised that this applies only if the fitting is judged in terms of actual behaviour. For taking a cast and altering the mould so as to conform statically to the above requirements will as a rule not result in a lens that fits as expected, and further alterations, dependent on the accuracy of the cast and on the morphology of the eye (configuration of the eyeball, thickness and compressibility of the conjunctiva, lid pressure, etc.) are necessary to prevent rotation and dislocation and thus to produce a dynamically balanced fit which promises satisfactory wear.

In the following years evenness and steadiness of fit gained in importance, and eventually it was clear that for mere physical comfort nothing equals an even fitting such as I advocated in Oxford in 1937. If a lens is made so as to touch the eye evenly over the cornea and the bulbar conjunctiva with a gentle clearance towards scleral and limbal margins, comfort is immediate and lasting. Care must be taken, however, to assure that what *appears* to be an even fit *really is* an even fit. Thus for instance the loss through grinding out a capillary layer of glass in the centre raising it by 50μ, should completely sever contact with the cornea; scleral sectors must not only touch evenly but also help their neighbours and their counterparts in the opposite half of the same meridian—for no meridian, not even the horizontal, is ever in full view in its entire length—to keep an equal, even proximity to the surface of the eye.

This, of course, can neither be reached nor confirmed, except by actually altering the inside of the lens, grinding out some areas and propping up others with capillary layers of wax. Individual fitting today still means a series of adjustments immediately proved right or wrong by trial and error. Judging the fit correctly is helped by the behaviour of conjunctival vessels as well as by the route rather than the presence of air bubbles whilst the lens, after dry insertion, is touched home.

If the scleral sectors are well balanced a horizontal mark on the lens will keep its position, rotating some degrees only when the eye moves towards extreme positions (mostly up and in), but returning to its original line when looking straight again. Such a lens will follow the moving eye with less than 1 mm. lag, without showing blanching areas, and without letting an air bubble slip in from the periphery.

To reach a balanced, even fit is sometimes easy. More often it means painstaking, exacting work, sometimes exhausting the time and patience of the prospective wearer to a degree. In fact, a number of final lenses had to be made during the war years, when time was limited and carrying out the work was imperative, which were necessarily a compromise between "theoretical" requirements and practical usefulness. Complaints arising out of this have been invariably put right by finishing the fitting to routine accuracy.

The last ten years' work at the Contact Lens Centre brought conclusive evidence as to the existence of a well defined type of fitting that gives maximum comfort beyond doubt; moreover, there is sufficient proof (over 2,000 cases) that given the time this type of fitting can be attained in every case, whatever pathological conditions prevail (trephine scars, cystic scars after extraction, symblepharon bridges, scarred atrophy in delayed mustard gas keratitis, advanced stages of trachoma and pemphigus, etc.).

Whilst workers were pre-occupied with the difficulties of producing contact lenses which should be both tolerable and optically corrective—fighting all the time the suspicion and bias of the medical world—the minor drawback of a slight blur which develops only after several hours of wear, remained wholly in the background. For people who wear contact lenses for periods of two hours or more (sometimes less) will, as a rule, develop a corneal haze very similar to that accompanying a mild attack of glaucoma. Under the slit-lamp a faint epithelial oedema is seen, the patient notices a slight bluish haze in daylight and coloured haloes around lights in the dark. After removing the lens the condition clears in 20-30 minutes.

Described as early as 1889 by A. Muller, who noticed the phenomenon in his own eye, it was not until the International Congress in Amsterdam, 1929, and the launching of Zeiss's larger set of contact lenses by Heine that an interest in contact lenses was taken up on a larger scale and that the frequency and constancy of the "veil" was observed by all. My first intimation of any definite opinion as to its nature (oedema) and seat (corneal epithelium only) was in 1934 by personal communication from Prof. C. H. Sattler of Koenigsberg. Hence the name.

Sattler's veil, although the commonest change in the corneal epithelium is by no means the only form of epithelial oedema that contact lenses may cause. More pronounced changes were first observed by Fick in 1887 in the rabbit. In man the swollen epithelium may assume a stippled or wrinkled surface; the fitted pattern of the former shows an array of tiny air bubbles over areas in contact with the smooth lens, suggesting that each pit is an imprint of a tightly captured minute air bubble. Wrinkles, particularly when covered by a large air bubble behind a lens fitting loosely in the centre give the impression as if the cornea had dried out. Sattler's veil, on the other hand, is even and macroscopically diffuse. As a rule it starts quite imperceptibly all over the cornea, but in some cases it may begin in an odd sector somewhere in the periphery, spreading in irregularly coalescent streaks towards and past the centre. Also, if the epithelium is allowed to swell further, particularly in some morbid cases, the oedema will collect in vesicles of various sizes, but clustering over one preferential area. Loss of corneal epithelium, if it ever occurs after removing a contact lens worn too long, *i.e.*, over two hours after onset of veiling, is the result of burst vesicles and not of suction and tear.

Any permanent damage I have seen in the last fourteen years with evenly fitted contact lenses was the consequence of secondary infection of epithelial lesions of this kind in persons who grossly ignored the veil (one street trader with conical corneae who had not the intelligence and one jungle fighter who had not the chance to remove the lenses in time, also a high myope who would not be discouraged from over-wearing his contact lenses).

As to the aetiology, it is rather obvious that some change in the physiological functions of the cornea caused by the continued presence of the contact lens must be responsible. One school of thought stressed "internal suffocation," interference with the blood circulation, strangulation of the limbal mesh that provides the nutritional fluids for the cornea and of the small veins of the ciliary region that help to carry away toxic products of metabolism. Others thought that, at least in this latter respect, some extra ocular

factors like stoppage of tear circulation, prevention of the constant massage of the eye by the lids (blinking) and occlusion of the cornea from the air, are of greater importance.

There are many arguments against the "outer suffocation" theory. Surely, we do not wake with a veil after a sound night's sleep. Airtight bandages and Lohnstein chambers can be worn for hours on end without any corneal haze developing. And there is plenty of scope for tear circulation under any evenly fitted contact lens (if inserted with 5 per cent. argyrol, the brown tinge turns yellow and vanishes within minutes), yet the veil will appear inexorably after a number of hours.

The length of clear wear, *i.e.* the initial period between insertion of the contact lens and onset of the veil, shows considerable individual variations and tends to confuse the issue rather than clarify it. In the first stages of wear it usually takes 2-3 hours for the veil to appear, but in some cases of supposedly reduced vitality, like extreme myopes, aphakic eyes with cystic scars, extensive post-operative or inflammatory scarrings in the limbal area, etc., it may be as little as 40 minutes; and it may take over an hour to clear away. The veiling may be different in the two eyes of the same individual, in aphakics this is rather the rule than the exception. On the other hand, in some cases, particularly in some very young and fit people, it may be very long indeed before the veil appears. In a 19-year-old service-man, who once wore his lenses for nine days and nights without removing them, the veil was perceptible at the end of the day, but disappeared overnight. In cases of reduced corneal sensitivity the veil is often too slight to notice.

Apart from these individual variations the clear periods show a regular increase with regular wear, reaching a limit within 3-8 months; in constant wearers this will amount to 8-14 hours per day if split up into two approximately equal periods with a 1-2 hours' rest in between. It is then not unusual to find a marked decrease in the tension of the eyelids; I shall come back to this presently.

Lacking biological foundation, measures to influence the veil were for a long time few and empirical, if any. Experiments with Zeiss's spherical sets in the early 1930-s seemed to show that lenses that sit on the cornea cause less veiling than those with a space between. However, spherical lenses of a tighter corneal fit are very irritating and too trying to wear for long enough for the veil to appear.

With the advent of individual fitting, this early rule of more irritation—less veil; less irritation—more veil, seems to have

changed to the contrary; on the same eye an evenly fitted contact lens will cause earlier veiling when the eye is irritable. Clumsy insertion, inclusion of a rubbing eyelash, smoky atmosphere, a hot room, reading at too close range, will cause avoidable irritation and precipitate an early veiling, whereas open air on a dull, cool day will keep off both. Earlier veiling, after all, seems to go hand in hand with discomfort rather than the other way round.

The fact that a loosely worn, comfortable contact lens allows a longer span of clarity, that insensitive or hypo-aesthetic corneae hardly veil, and that increasing use makes for decreasing veiling, all point to the tension of the eyelids as playing an important rôle in pressing the lens so tightly on to the surface of the eye as to interfere seriously with some of its physiological functions. Although I suspected this many years ago (Hung. Ophthal. Soc., 1931) it was F. A. Williamson-Noble who first succeeded in obtaining decisive experimental proof. In some stubborn veilers Williamson-Noble blocked the facial nerve with proctocaine and found a considerable extension of clear wear. As long as the akinesia lasted, and in at least one case much longer, the veil never appeared. But there were some failures, too, one veiling in 40 minutes while both eyelids were still quite paretic. Also I felt that a facial block was too heavy a price to pay for wearing contact lenses. I decided therefore to resume some of my early experiments.

First I wished to find out to what extent I could relieve the conjunctiva from pressure by more conservative means. Then I wanted to go into the possible merits of the " outer suffocation " theory championed by F. P. Fischer.

Accordingly some cases with good tolerance but early veiling were tried again with lenses that fitted so as to make more use of a corneal fulcrum. In some cases veiling was appreciably postponed (in one high myope clear periods of three hours were extended to six hours, making a daily total of 12), but in many others the improvement was less obvious and, as expected, increased irritability often prevented longer periods of satisfactory wear.

For experiments with free air circulation I picked two patients, one aphakic (R.E. 4 hrs., L.E. cystic scar, 45 min. veiling) and one myope (2 hrs. R. & L.). First I inserted a contact lens with a 14 mm. opening in the middle, a sort of individually shaped scleral ring. This did not give rise to a veil at all. Subsequently the opening was reduced so that the lid no longer touched the middle of the cornea whilst blinking. Still, there was no veil. Further reduction of the hole seemed to defeat

its purpose by getting blocked whether it was cornea or conjunctiva that lay behind it, and the veil appeared again.

However, by careful adjustment the lenses were finally made to fit so as to keep up air circulation through one or more active perforations and yet remain in constant contact over the pupillary area.

This was reached by making the inside curvature grossly flatter than that of the cornea (*e.g.*, 8·5 mm. radius if that of the cornea is 8·0 mm.), thus providing ample air space around the limbus where the lens is subsequently perforated. Perforations under the upper lid are more cosmetic but less efficacious, partly because the lid itself blocks the way of free diffusion, and partly because sinking of the lens by gravitation places the cornea in an upward eccentric position thus blocking free access to the circling air bubble.

Since these two cases were fitted there has been hardly enough time to experiment on a large scale, but the absence of veiling has been invariable in all the cases I have since fitted on these lines.

Apart from the absence of veiling, there is another striking feature, *i.e.*, the absence of the initial irritation. So far it was usual to find that in the initial stages twenty to twenty-five minutes after insertion a certain amount of irritation developed which was immediately relieved by detaching the lens from off its seat ("loosening," lifting the lens off the eye by hooking the fingernail behind the outer edge whilst looking nasally). Most people overcame this trouble in the course of regular wear, and it was generally assumed that the cause of the phenomenon was mechanical irritation through suction precipitated and aggravated by the tension of untrained eyelids. It now appears that this irritation was not mechanical at all, but chemical, probably due to the gradual rise of the pH as the CO_2 concentration increased. Any additional factor that contributed to quicker production of CO_2, including hyperaemia due to mechanical irritation and to increased sealing off of the pre-corneal space (tighter scleral fit) was thus capable of hastening the appearance of the veil. It looks as though not only Sattler's veil is clearing, but also the one which obscured our knowledge of its aetiology.

From the foregoing it would appear that the principles of fitting have come back full circle with "breathing" again in the foreground, but with a difference; whereas previously breathing was achieved through an unbalanced fit, thus causing mechanical irritation which more than outweighed chemical comfort, it is now possible to introduce free air circulation into a lens with an even balanced fit.

The new type of fitting is by no means without additional

difficulties. What is most bewildering for the fitter is the complete absence of suction, with the lens actually falling out of the eye as the upper lid is lifted. As regards the patient, the optical effect of peripheral air bubbles is hardly perceptible and, if so, easily overcome, but holes showing in the palpebral aperture are not aesthetic although a perforated contact lens in a comfortable white eye is much less conspicuous than an unperforated one in an irritable eye however slight the irritation that precedes and accompanies the veil.

However, once there is a working principle, I am confident that ways will be found, perhaps through a combination of air pockets and channels, and holes where they are not visible (porous substances would probably have a limited delaying action only, like buffer solutions), to overcome this last minor trouble with contact lenses.

I would like to take this opportunity of thanking Mr. F. A. Williamson-Noble for his kindness in allowing me to make use of material from his hitherto unpublished experiments. For permission to refer to their cases I wish to acknowledge my indebtedness to Lady Duke-Elder, Mr. A. Rugg-Gunn, Mr. P. G. Doyne and Mr. T. G. Wynne Parry, and in particular to Professor Ida Mann for her invaluable co-operation over many years.

Technical facilities were generously placed at my disposal by Messrs. Theodore Hamblin, Ltd.

CONJUNCTIVAL FINDINGS IN CASES OF COLD HAEMAGGLUTINATION*

BY

SÜREYYA GÖRDÜREN

ANKARA

THE investigation of conjunctival blood circulation in cases of cold haemagglutination, where capillary and blood changes occur, is very important.

Before the following details I will explain some peculiarities of conjunctival blood circulation. Conjunctival vessels contrasting with the bright colour of scleral tunic can be clearly seen with the naked eye. When we use slit-lamp microscopy it becomes the ideal place for capillaroscopy.

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The conjunctiva has two kinds of vessels, one superficial and, somewhat lighter in colour, the other deep and of a dark blue colour. Especially in superficial vessels one can examine in detail the vasomotor reactions, the stream of blood cells.

Recently we had the opportunity of having these examinations on two patients suffering from cold haemagglutination.

1—Ayvaz Alçin, aged 39 years, Kalecik.

2—Hüseyin Evren, aged 22 years, Tokat.

Before the experiment we made surface anaesthesia by instilling 3 per cent. cocaine solution into the conjunctival sac. The least eye movements during the slit-lamp examination of conjunctival vessels, especially with high magnitude, change the eye-field and spoil a thorough investigation. This is the reason why we used cocaine, although it had some interference with the vessel walls.

For cooling the conjunctival sac we used isotonic salt solution in varying temperatures. The results may be summarised as follows:—

TABLE I

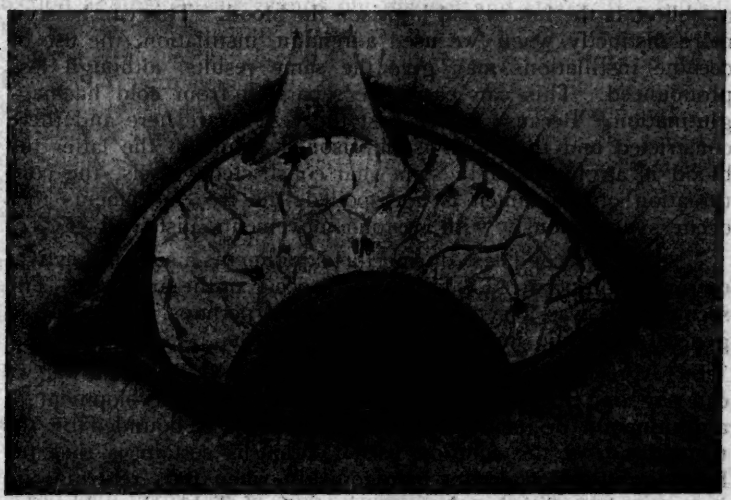
Temperature in Centagrade.	Segmentation of blood into columns				Interval beteen cold application and segmentation of blood into columns.	Interval between stopping cold and returning normal.
	S	M	G	L		
37	−	−	−	−		
27	+	−	−	−	45″	45″-60″
25	+	+	−	−	30″-40″	60″
20	+	+	+	−	25″-30″	60″
18	+	+	+	−	20″-25″	120″
15	+	+	+	−	20″-25″	130″
10	+	+	+	+	15″-20″	130″
5	+	+	+	+	5″-10″	150″
0	+	+	+	+	3″-5″	150″-170″

S = superficial vessels, M = medium sized vessels, G = greater vessels, L = large vessels.

A routine examination of the above table shows the following results:—

1. In body temperature (37°) the blood column has the normal appearance in vessels. Under this temperature this normal appearance began to disappear and at 27° the changes became

obvious, blood corpuscles agglutinate in vessels, and divide into columns. With the influence of cold first the blood stream in all conjunctival vessels increases, and in some where previously it was not obvious it becomes visible. This can be easily understood; in the normal lumen of the vessels the blood corpuscles have a slow and scattered course. When vaso-constriction occurs they close up and fill the narrow lumen and have a swift course and are thus rendered obvious and visible.



2. The segmentation and division of the blood into columns occurs first in the superficial small vessels. With the decrease in temperature the same procedure occurs in the medium sized, in the great and in the greater vessels. This can be explained by the fact that the small and superficial vessels are first affected by the cold. Here the vaso-constriction effect is greater and this is added to haemagglutination.

3. In the arteries where the blood columns have been divided into pieces, a movement synchronous with the systolic movements persists a certain time, which changes with the temperature of the solution. Then the blood stream stops and takes on the appearance of thin red rods.

When the temperature is rather high this occurs in the small and superficial vessels only, when it falls the great vessels are also affected.

4. When the segmented blood columns are examined with high magnification their borders are irregular and have the appearance of a flocculation made of aggregated blood cells.

5. When the temperature decreases the length of columns decreases, and when the temperature increases the length of columns also increases.

6. We had control tests on ten healthy men. Here cold caused a vaso-constriction and this caused the cessation of the blood stream, here and there the constriction was great enough to obliterate the lumen and imprison the blood. This can be seen more distinctly when we used adrenalin instillation, the use of cocaine instillations may give the same results, although less pronounced. This can easily be separated from cold haemagglutination. Because in the first the vessels are here and there constricted and the blood is imprisoned, while in the latter the blood is agglutinated in somewhat constricted vessels, the continuation of the lumen is not spoiled, the free movements that occur synchronously with systolic movements justify it.

7. In our second case during the experiments a subconjunctival extravasation occurred. This did not occur in the first case. The second case was a syphilitic person, and perhaps it was due to general syphilitic involvement of the vessels.

8. Agreeing with Daniel States and Jesse G. M. Bullowa, we can say that there is no certain degree for the development of agglutination or its normal condition. This is bounded by the temperature of the solution used. What is certain is that the haemagglutination occurs more quickly when it is returning to its normal condition. An examination of Table I makes this clear. There is one more point, the figures in the table are not absolute. Hence we used a minimum and a maximum time. The reason is clear. We cannot find the same mathematical results in all vessels of the conjunctiva. Even the normal conjunctival vessels show capricious changes. One cannot give absolute figures for these vessels which show capricious changes even under normal conditions. On the other hand, according to nutritional requirements, in some conjunctival vessels the blood stream may stop for a varying period and may start again, and this renders the mechanism more capricious.

EGYPT'S CONTRIBUTION DURING THE WAR TO PROTECTION AGAINST DISEASE THROUGH CARE OF EYES OF BABIES*

BY

FARID MASSOUD

CAIRO

ONE achievement Egypt contributed during the war for protection against disease stands out distinct and clear. It received the seemingly inappropriate but wholly adequate name of Care of Eyes of Babies which told very little but signified a good deal. For it is to be remembered that the importance of care of eyes of babies lies not only in protection against ophthalmia and trachoma, essential as this is, but in extending much farther in the spheres of general sanitation. It is very much connected with pure water, the fight against dirt and flies, the enlightenment of the mothers, and in fact with all the general hygienic requisites.

The condition of health in the eyes of babies in a locality is a reliable indicator for estimating the degree of good sanitation and salubrity in that locality and furthermore, in instituting care of eyes of babies in a locality, the solid foundations of good sanitation are thereby instituted there and a rise in the standard of general health is a sure consequence.

To understand what was achieved in this direction, it is necessary to go back a little and contemplate the time at the beginning of the war. There was then the general feeling shared by all workers in the spheres of preventive medicine in the country, concerned with taking up of new responsibilities that began with the arrival of our guests, the troops of the allied armies. It was incumbent on the internist as well as on the ophthalmologist to exert more of vigilance and pay more than the usual attention so that the standard of protection against disease be at a satisfactory level and at the highest possible degree. This inconspicuous and silent endeavour existing within the boundaries of individual activities was soon to be made visible and solid. Dr. Ali Ibrahim Pasha, on the advice of the Egyptian Government Health Expert, took the initiative and as Minister of Health then, called up the formation of a committee, to make a study and report on the question of protection against ophthalmia and especially trachoma in Egypt.

The committee was formed from eminent scientists, Mazni Bey, Tewfik Bey, Dr. Wilson, Riad Bey and Taher Bey. They had several meetings and presented their report in October, 1941. The whole problem was dealt with in a very comprehensive and far

* Received for publication, October 24, 1945.

reaching way in the light of a detailed paper dealing with this subject and published in the "Egyptian Gazette" on September 23rd, 1941. Care of eyes of babies was given the first place, being considered the basis of the whole work. The committee strongly recommended and insistently advised the care of eyes of babies from the time of birth up to five years of age.

To extend this basic undertaking over the whole land, the report further advised an increase in the number of health centres and ophthalmic clinics in the whole country, considering that the fight against trachoma and ophthalmia would go hand in hand with all the other works of medicine, all aiming together at the raising of the general standard of health. Several other points were taken up also in the report, all of which received the attention due to them in their corresponding circles. One outstanding achievement that followed immediately after deserves to be especially mentioned as it constituted the next step in the realisation of this all inclusive plan of protective medicine. This was the promulgation of the Law of Rural Health Reform in 1942 through the extensive work of the late Dr. Abdel-Wahid Elwakil Bey, thus assuring a continuous and steady increase in the number of units and medical centres in both rural and urban districts.

And now that all this is made clear, let us look at the present state of care of babies' eyes. The babies are brought at the present time to Government and other child welfare centres, by their mothers without undue urging, once a week at least, beginning from the age of three weeks after birth. The mothers listen to the simple talks addressed to them by the special nurse and seem to be happy to put themselves under the guidance of the authorities in everything that pertains to hygienic measures. Those are the mothers on whom lies really the burden of the fight against disease. They are already provided with instructions by way of their babies. For the sake of these babies, the mothers co-operate in health reforms and give their indispensable aid in the work of protection against disease.

The figures of attendance in Government welfare centres reached 1,354,967 in 1944. In the ophthalmic hospitals, a still higher number of attendances was reached for babies less than five years of age who received treatment and care of eyes during the year. If statistics are extended to other state and national institutes caring for eyes of babies in the country, it will be found that the total reached four millions.

One possibility can be seen as coming to be realised for the first time in the very near future. It is the existence of trachoma-free schools. As can well be ascertained, there are sufficient pupils, teachers and attendants who have a healthy state of the eyes with regard to trachoma, to the extent of making possible the assignment

of some of the existing schools solely to them, and restricting future admission to those who are free from the first stages of trachoma, or in other words those who are practically cured from it.

The obvious good effects resulting can well be judged from now, as the urge is created in the pupils who are refused admission to these privileged schools, to attain higher and higher standards of eye hygiene and of general health. These pupils and their families will exert themselves more and more in the field of protection against disease.

Another step forwards in this direction seems to be also coming in the very near future. This is legislation for care of eyes of babies. When this comes, as it is bound to come sooner or later, it will be the official recognition of the existing state. The work is already proceeding and is steadily gaining in speed and momentum.

The final word in this record of work is a look forward to the time that is coming soon, for what the ophthalmologists of Egypt may be able to achieve as trachoma experts in the fields of anti-trachoma work that will be opening up.

Care of eyes of babies will still be the heading that will crown all the protective measures against transference of the disease to healthy localities from regions other than Egypt that are afflicted with trachoma.

The statistics given in the following tables show the condition of the conjunctiva in its relation to health and disease. The cases examined were from Government child-welfare centres, children's classes, primary boys' and girls' schools and secondary boys' schools. As far as could be ascertained, no lengthy treatment was undertaken immediately before the dates of examination of the eyes and so these tables may be considered as accurate estimates of the condition present now, in a great part of the population of Egypt that are living under certain circumstances. In the first table, the number of cases examined was 123. The ages were from 3 weeks to 4 years. The first age in which an appearance of trachoma in the lids was manifest was noted to be about 6 months. From 3 weeks to 6 months, healthy conjunctiva was seen in about 60 per cent. of the cases. In the remaining 40 per cent. a minimum of attention and care would be sufficient to protect the eyes against ophthalmia and trachoma or to render the conjunctiva healthy again. From the age of 6 months to 4 years, healthy conjunctiva was seen in about 40 per cent. of the cases. With care during the first period as stated before the number of healthy cases will steadily be on the increase.

In the second table, the number of cases examined was 1,229. The ages were from 4-8 years. The percentage of healthy conjunctiva reached as high as 80 per cent in some cases. In the third

TABLE I

CONDITION OF THE CONJUNCTIVA IN DIFFERENT AGES

Abbassia and Sharabia Child Welfare Centres

Age	Total	Healthy	T_1	T_2	T_3	Per cent. healthy
3 weeks to 3 months	12	6	1	—	—	60
3 to 6 months	12	4	1	—	—	—
6 months to 1 year...	24	4	15	1	2	—
1 to 1½ years ...	52	17	23	1	6	40
1½ to 2 years ...	16	—	8	1	1	—
2 to 4 years ...	7	1	2	1	2	—

TABLE II

Abbassia Kindergarten and Primary School

Age		No. of cases	Healthy	T_1	T_2	T_3	Per cent. with healthy conjunctiva
4–5 years	girls	14	10	3	—	1	72
	boys	54	42	5	—	7	78
5–6 years	girls	43	33	6	—	4	77
	boys	41	30	7	—	4	74
6–7 years	girls	38	31	3	1	3	81
	boys	38	28	3	—	7	73
7–8 years	girls	77	68	4	1	3	90
	boys	924	248	24	14	210	74

TABLE III

Primary Abbassia Gamalia Sayeda Nafeisa

Age		Total	Healthy	T_1	T_2	T_3	Per cent. healthy
8–9 years	girls	46	34	5	2	5	76
	boys	442	278	33	6	125	63
	boys	90	38	5	7	40	48
	boys	82	53	7	1	21	64
9–10 years	girls	85	77	2	—	6	90
	boys	200	159	10	1	30	80
	boys	52	20	8	3	21	39
	boys	40	22	3	1	14	55
10–11 years	girls	69	54	4	—	11	78
	boys	126	94	9	—	23	75
	boys	96	64	3	2	27	67
	boys	27	15	2	1	9	56
11–12 years	girls	33	29	2	—	2	88
	boys	203	176	—	—	27	87
	boys	77	40	6	—	31	52
	boys	21	11	2	—	9	52

table the number examined was 1,467, the ages were from 8-12 years and healthy conjunctiva was noticed to reach in some instances to 90 per cent.

This happy result is due no doubt to the hard and continuous efforts of the section concerned with the fight against trachoma in the schools, this together with the gradual enlightenment of the mothers.

ANTI-TRACHOMA WORK IN EGYPT IN ITS RELATION TO THE FIGHT AGAINST OTHER DISEASES

In the fight against trachoma in Egypt, as in no other disease perhaps, the collaboration of Anglo-Egyptian efforts has been effected with such marked and outstanding success.

It was in 1902 that the late Sir Ernest Cassel began work against trachoma in Egypt by his generous donation of £40,000 given into trusteeship to the representative of the British Government in Egypt with this object, "to teach the principles of ophthalmic surgery to Egyptian surgeons in order that they may later on give their services gratuitously to relieve the suffering of their fellow countrymen from these prevalent eye diseases which result so frequently in blindness."

This object was successfully attained through the big efforts of A. F. MacCallan during a quarter of a century.

In 1925, the Imperial War Graves Commission gave £6,600 for erection of the Giza Ophthalmic Laboratory as memorial to the men of Egypt, Labour and Transport Corps, in the first great war. This laboratory, since then, has been giving most valuable work in the fight against trachoma.

Now, the extent of spread of trachoma in a locality is directly in proportion to the degree of sanitation there, the one is bound to affect the other as the two are so intimately connected together.

When the war began, this relationship was made use of to help in protection not only against ophthalmia and trachoma but also against disease in general, and this through active co-operation of the mothers.

In their carrying out hygienic instructions and measures for the care of the eyes of their babies, they managed not only to bring about a rapid raising of the standard of general health in the country but also to ensure protection against the spread of disease, an object so much desired at such a critical time when multitudes of allied troops were constantly arriving in Egypt, either to stay for some time or to proceed from there to other places.

Much of the credit of bringing this accomplishment about goes to the late Dr. A. W. Byrne, Health Expert to the Egyptian Government. On his advice, the Minister of Health called

the formation of the Committee whose report submitted in October, 1941, constituted the plan of the work that was performed subsequently.

Special reference should be made here to the kind support to this work of H.E. Lady Jacqueline Lampson (Killearn).

For the details of the work achieved, the archives of P.H.M., Cairo, should be consulted. Only a brief outline is given in this paper, read at the meeting of the Ophthalmological Society of Egypt.

It is to be hoped that this traditional collaboration of efforts in the fight against trachoma will be continued not only in Egypt but also outside this country, on a wider scale, now that the war is over and bigger fields of anti-trachoma work will soon be opening up.

PROPTOSIS—DIFFERENTIAL DIAGNOSIS

BY

FARID MASSOUD

CAIRO

DIAGNOSIS of cases of proptosis is of importance to the physician and surgeon as well as to the rhinologist and ophthalmologist. In fact, here is a problem which touches different fields of medicine and for which co-ordinate working of men of different specialities is often necessary.

By the term proptosis is meant a state of protrusion of the globe of the eye between the lids. Exophthalmos is synonymous. Beer suggested calling the affection exophthalmus when the protruded eye is in its natural state, exophthalmia when it is inflamed and exophthalmoptosis when the displacement is caused by division of the nerves and muscles of the orbit or by paralysis of the latter.

As is well known an end diagnosis of a case of proptosis is not always easy. For this reason, it will be found helpful if as a first step an attempt is made to place the case to be diagnosed in one of six main types or categories. These are:—1. Apparent; 2. Due to a congenital anomaly; 3. Due to a traumatic injury; 4. Due to an inflammatory process; 5. Due to a new growth; 6. Due to systemic trouble or disease.

It will not be difficult usually to place a case, from the general examination and the history, in one of these main types, this notwithstanding the possibility of an overlapping, as in cases that are due to a trauma and inflammation together, or in cases that present a congenital origin with a new growth, etc. And so having

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placed our case in the most likely category, we proceed to differentiate between the states of the one type under consideration. For this purpose it will be found necessary to use different methods of examination. The nearest are the ophthalmological and rhinological, and then the X-ray appearances, blood tests and blood cytology. The remotest include special laboratory studies, medical and surgical procedures.

Under type I.—the apparent cases of proptosis, the globe is not really displaced. There are the cases of high myopia, buphthalmos, megalophthalmos and staphylomata[1]. Also cases of 7th nerve paralysis where the palpebral fissure gets wider with retraction of the lids.

In type II.—that which has a congenital anomaly, we have those cases of imperfect development of the orbit, cases of premature ossification, synostosis of coronary or sagittal sutures in oxycephaly, whereby the growth and increase in size of the brain, pressure is exerted on the orbit from the back with consequent proptosis of different degrees up to a complete forward dislocation[2]. This may be associated with divergence of the eyes, pressure atrophy of optic nerve or a choked disc. When arrested development occurs along the lines of the orbito-nasal fissure, fronto-ethmoidal or sphenoidal sutures, thus leaving a defect in the orbital wall, then a hernia is the result; meningocele, encephalocele, encephalocystocele, coming into the orbit with consequent proptosis. All these appear as tumour masses at the upper and inner angle of the orbit, reducible if the aperture in dura is not closed.

Type III.—With cavernous sinus thrombophlebitis, swelling of lids is followed soon by exophthalmopligia, 3rd, 4th and 6th nerves passing through the sinus are usually affected. There is marked distension of retinal veins; and the condition becomes bi-lateral very soon. The sinus may be affected by way of petrosal sinuses in middle ear disease[11]. Exophthalmos may then be moderate and transient as venous congestion subsides. When infection is found in the ear region, exophthalmos with chemosis may be elicited by pressing on the neck with a sand-bag if the cavernous sinus is involved.

Type IV.—Inflammation of nasal sinuses frequently involves the orbit, especially with ethmoid cells which are separated from the orbit by the lamina papyracia[12], with consequent orbital cellulitis, sub-periosteal abscess, orbital or retrobulbar phlegmon.

With a state of subacute or chronic inflammation of the sinuses, a mucocele is formed and this is a frequent cause of unilateral proptosis[13]. Congestion occurs in the orbital cavity on the affected side with chemosis of conjunctiva, redness of lids, headache and fever. Vision is reduced, globe is fixed and proptosed in a direction away from the site of disease[14]. In ethmoid disease it is pushed laterally, in frontal sinus affections it is pushed down with tenderness

at the orbital margin. Choked disc is usually seen and panophthalmitis may follow. The onset of proptosis is gradual in a case of mucocele until it ruptures when it may produce sudden exophthalmos.

Other inflammatory conditions with proptosis are orbital periostitis (pneumococcal) which is more frequent and less serious than the tuberculous form with sequestra, fistulae and possibly tuberculides of the skin. Both are to be diagnosed from syphilitic periostitis with early bone hyperplasia, and gumma with deep seated pains.

Under proptosis with inflammatory conditions come also those cases in which it is noted to occur after infection has passed and is due to impeded circulation in the orbit. Also those known as pseudo-tumours from low-grade non-mycotic inflammation, as well as cases of strepto-actino-mycosis with fistulae, anthrax, hydatid cysts, and trichinosis with orbital muscle pains—all of which need special laboratory studies for diagnosis.

Type V.—Cases of New growth—these include:—

a. Tumours of intracranial origin which produce exophthalmos when pressing on a part of the orbit or subsequently penetrating into its interior. Unilateral proptosis has been observed to occur in about 2 per cent. of all cerebral tumours; uni- and bilateral in 8-10 per cent. of cases. The most frequent that cause exophthalmos are tumours of the base of the skull, frontal and temporal lobes, *i.e.*, those that have a direct connection with the orbit or that can determine increased tension in the middle and anterior cranial fossae. A meningioma, in Cushing's syndrome with orbital hyperplasia and thickening of the posterior wall, takes a slow course with no fundus changes. It is the cause in about 50 per cent. of unilateral[15] proptosis, then orbito-ethmoidal osteoma, then frontal bone osteoma.

Pituitary tumours eroding the sella and penetrating into the orbit cause proptosis with symptoms peculiar to that locality, hemianopia, acromegaly, etc. Tumours of the cribriform plate between the two orbits produce exophthalmos with mental signs resembling those of frontal lobe tumours; symptoms of a retrobulbar neuritis, central scotoma, with diminished vision may occur.

Tumours in and about the sphenoid fissure[16] compress motor and sensory nerves there, giving rise to ptosis, divergent squint, mydriasis and diminished cutaneous sensations in the face. Failing vision met with in these cases is usually long delayed until pressure is exerted on the optic nerve in or about the optic foramen.

b. Tumours from the mouth, cystic tumours from paradental epithelial debris and from post-nasal cavities, in the nasopharynx and nasal accessory sinuses, myxomata, chondromata, adenomyxomata, plasmomata, all cause proptosis when they extend to the posterior part of orbit through neighbouring structures, antrum or

ethmoid cells. With those that fill the posterior nares the patient has a peculiar look with mouth breathing and nasal intonations. New growth from nasal accessory sinuses, osteomata from antrum and frontal sinus reaching orbit by extension produce exophthalmos very gradually. The direction of displacement of the globe with extent of motility, transillumination and X-ray appearance of the orbit and surrounding structures help in locating the site of a tumour.

c. New growths originating from the orbit include carcinoma from the lacrimal gland growing between periorbita and bony wall; also cylindroma occurring as part of parotid mixed tumour in the lacrimal gland region, with absence of pain and histological structure resembling salivary tumour. Osteomata and fibromata from bone and periosteum, hard, resisting to backward pressure on globe, in contrast to a cavernous angioma which is soft and easy to press.

d. Ocular new growth. In primary tumours of optic nerve and sheath, proptosis occurs in about 7 per cent. of cases preceded usually by failing vision and white atrophied papilla. New growth occurring as such in the muscle cone pushes the globe directly to the front. Vision may remain unaffected if the optic nerve is not involved, as in vascular new growth with free play of muscles and not much pain. With those coming from inside the globe as choroid tumours, the fundus cannot be illuminated, vision is lost and pain is present. A complicated cataract is common. Glioma tumours occur in young children, showing peculiar fundus appearance and blindness early in the disease.

e. Metastatic new growth—sarcoma and carcinoma have been mentioned as causing proptosis with malignant disease of the kidney in children[17]. Of great help in diagnosis of all cases of new growth is to note in X-ray pictures the presence of orbital dilatation and its significance whether primary or secondary, also the faint shadows of tumour masses, with marks of pressure atrophy on adjacent tissues and of erosion when the growth is malignant.

VI. Proptosis connected with systemic troubles has an intimate relation with endocrine activities and with the sympathetic nervous system. The mechanism of action is through venous dilatation associated with nervous stimulation of the orbital contents. It is noted to appear as a transient protrusion of the eyes in sudden and violent emotions, in cases of angio-neurotic oedema, during menstruation and in child-birth. Such temporary protrusion of the globe could be induced by ephedrine which is a specific sympathetic excitant and inhibited by yohimbine, a depressant to the sympathetic.

Transient proptosis may be the first sign of a threatening exophthalmic goitre. This disease, known also as Basedow's and

Graves' disease, though connected with the thyroid, is believed to be not a primary disease of that gland. Increased thyroid secretion facilitates the appearance of exophthalmos and vice versa, hypothyroidism induces enophthalmos[18]. For the diagnosis of Graves' disease there are the classical signs, von Graefe's, Stellwag's, Moebius', Gifford's and Dalrymple's. Fine tremors of the extended hands occur, with nervousness and increased pulse rate. Exophthalmos may be associated with oedema of the conjunctiva. The orbital contents show vascular dilatation, cellular invasion in the perivascular lymph spaces, oedema of tissues and sometimes increase in orbital fat with some hypertrophy of ocular muscles. The condition may be uni- or bilateral.

Of congenital origin also are some vascular tumours of the orbit, lymphangiomas, dermoid and retention cysts in which proptosis may be associated with optic atrophy[3]. They occur near the lacrimal gland region and are usually compressible when palpable[4]. Their onset at an early age, with slow development if any, absence of other pathological signs together with X-ray pictures help in their diagnosis.

Of tumours that have a congenital background or predisposition are the neurofibromata or plexiform neuromata that grow by proliferation of peripheral nerve endings[5]. They produce exophthalmoptosis with possibly ocular motor disturbances.

Of systemic diseases that have a congenital origin and in which proptosis may make its appearance is van der Hoeve's syndrome of blue sclerotics. The pathology is said to be endocrine with a disturbance of calcium and phosphorous metabolism[6].

III. Traumatic cases include wounds of the orbit with possibly foreign bodies retained there, fractures of the base of the skull, injury to blood vessels and to the cavernous sinus, also injuries during birth in infants. With a history of injury, the classical signs may not appear all at once, there may be crepitations, emphysema, lacerations of extra-ocular muscles, orbital haemorrhage, and impaired ocular motility. Pulsating exophthalmos makes its appearance in such cases. The lesion may be intracranial, connection taking place between the internal carotid and the cavernous sinus—intra-orbital with aneurysm of the ophthalmic artery—or extra-orbital with connection between carotid and jugular. It may be possible to observe modification of bruit, exophthalmos and pulsations when temporary pressure is applied over the carotid in the neck.

In rupture of the carotid into the cavernous sinus, the first symptom is usually abducens paralysis, then unilateral exophthalmos[7]. There may be no pulsation but only a swishing sound over the temples. Later fundus changes occur with dilatations, tortuosity of veins and increased intra-ocular tension.

Proptosis when unilateral, pulsating, progressive and reducible

is almost always due to arteriovenous aneurysm; when intermittent, nonpulsating, it is orbital varicocele[3] that follows position of the head. It has been noted to be nine times more frequent in the left orbit than in the right. Vision is not affected except rarely when complications occur or haemorrhage.

After trauma, thickening of the bones of the orbit underneath the periosteum may occur with proptosis, from encroachment on the globe. It is met with in the frontal, maxillary or sphenoidal bones. The growth is slow and vision is not much affected. There is proliferation and hypertrophy with no material change in the structure of bone.

IV. Proptosis with inflammatory conditions may follow injuries or occur *per se*. With acute inflammation, conditions are met with, varying from a simple dacryo-adenitis to penetrating wounds of orbit associated with septicaemia, septic thrombosis of the cavernous sinus and lateral sinus and tetanus. Infection may occur through the nose, the pharynx, the nasal sinuses or other inflamed neighbouring structures around the orbit. There are then the signs of infection—pain—often severe, redness, oedema of lids, chemosis with the upper lid falling down on the proptosis, also raised temperature and toxaemia.

An orbital abscess may form remaining unilateral, fixing the globe or rendering its movement painful[9]. Acute orbital cellulitis may begin on one side and rapidly extend to the other or toward the brain with consequent raised intracranial tension, inadequate venous drainage, engorgement and oedema of orbital tissues and proptosis[10]. Chemosis of conjunctiva with swelling of lids, 6th n. paralysis, reduced vision and toxaemia are usual signs. A cytological blood count is of help.

In ordinary cases of Graves' disease, exophthalmos may persist in spite of medicinal and surgical treatment; the palpebral fissure is enlarged with frequently inadequate protection of the eyeball.

Malignant exophthalmos[19] is a serious condition occurring with thyroid pathology when the basal metabolism is within normal limits. It is supposed to be due in part to pituitary activity or in fact to a general polyglandular upset.

With pituitary pathology uni- and bilateral exophthalmos has been described, associated with retrobulbar venous stasis, a condition being most marked with the eosinophilic form of oedema of pituitary[20].

With vitamin C deficiency and infantile scurvy, haemorrhages in the orbit[21] producing exophthalmos occur. Proptosis appears suddenly and may be very pronounced. Also in rickets and haemophilia where the subperiosteal haemorrhages may be associated with extravasations in the skin of the lids.

In leukaemias and lymphoblastic allied conditions, infiltrations

with lymphocytes, endotheloid and giant cells occur [22], also in Mikulicz's disease with lacrimal and salivary gland enlargement. In all these cases a blood cytology is needed, for diagnosis.

Other hyperplastic processes invading the orbit and producing exophthalmos occur in the rare conditions of xanthomatosis, Schüller-Christian-Hans disease in young children. Cholesterin deposits in various organs and in skull bones occur with degeneration, diabetes insipidus and cessation of growth. Pressure and loss of bony support at the apex of the orbit produce proptosis usually bilateral with fundus changes and loss of sight.

In Paget's disease, exophthalmos occurs when bony enlargement is well advanced, also in leontiasis ossea occurring earlier in life and more often in females.

Cases

1. A. S.—boy aged 15 years—came with bulging of L. globe that showed as proptosis when the lids closed. It was only a staphyloma that extended over almost the whole cornea. An iridectomy was performed with puncture of the head of the staphyloma and a pressure bandage applied. The globe returned to a normal level within a week.

2. M. O.—boy aged 15 years—came complaining of a foreign body, a speck of dust stuck on the cornea. He presented a noticeable bulging of both globes dating from childhood. Neither his vision nor the globe movements were much affected. This case was of interest as an example of a congenital shallow orbit which was evident on X-ray examination.

3. F. O.—man aged 25 years—had a gunshot wound in the right temple. Sixteen hours later, he presented right bulging of the globe which was increasing with oedema of the lids and chemosis all extending to the other side and accompanied with toxaemia. The diagnosis of cavernous sinus thrombosis was confirmed by operation.

4. A. M.—boy aged 5 years—came with proptosis of the right globe that began three days before, first slight then rapidly increasing. Lids of right eye red and swollen, globe projecting to the right, conjunctiva swollen and congested with restricted and painful movements of the globe. Fundus normal and vision not affected. History of recurrent nasal catarrh. Slight fever and enlarged and tender pre-auricular glands on the same side. All the signs denoted the cause as being an orbital abscess. Diagnosis confirmed by exploratory puncture, and evacuation of pus followed by recovery.

5. F. S.—woman aged 40 years. Left proptosis down and out with limited movements up and out. Vision not much affected. Fundus appearance normal except for somewhat dilated veins. A

cystic swelling could be felt around the upper part of the orbit. The skin of lids normal, with no distended veins, no roughness of bony edges of orbit, no pulsations and not much pain. Rhinological and X-ray examination suggested mucocele of the left frontal sinus with absorption of the orbital wall. Diagnosis confirmed by operation.

6. B. H.—woman aged 50 years—came with the complaint of severe headache of two weeks' duration, more on the right side. Right globe proptosed with a slight restriction of movement, and failing of vision. History of vomiting unrelated to food. Fundus showed dilated veins and oedema of the papilla. Rhinological and X-ray examination showed nothing in particular. W.R. strongly positive. Diagnosis, probably gumma. It was confirmed by improvement on antisyphilitic treatment.

7. R. A.—a girl aged 13 years—presented a proptosed left eye with no vision. Fundus opaque, severe headache and vomiting. Diagnosis in this case was helped by the history of enucleation for glioma in the other eye six years before. Patient died one month later.

8. A. F.—a woman aged 35 years—presented proptosis of left globe. A mass could be felt at the upper and outer part of the orbit in the region of the lacrimal gland, vision not much affected. There was a diffuse swelling in the region of both parotid glands. Blood cytology showed increased lymphocytes. W.R. was positive, but no improvement on antisyphilitic treatment. This case was probably of the type of Mikulicz's syndrome.

Summary

1. Apparent—globe not displaced; high myopia; buphthalmos; megalophthalmos; staphyloma; 7th nerve paralysis.

2. Due to congenital anomaly—arrested development; cranial hernia; premature ossification; shallow orbit; tumour masses; vascular, nervous, mixed.

3. Due to traumatic injury—intracranial, tear of internal carotid and cavernous sinus; intra-orbital, aneurysm of ophthalmic artery; extra-orbital, tear of carotid and jugular; late effect, proliferation.

4. Due to inflammatory process—acute, from injury or extension, abscess, cellulitis, thrombophlebitis, anthrax; subacute, mucocele, retrobulbar, subperiosteal; chronic, tubercular, syphilitic, actinomycotic, hyatid, etc.; late effect, from obstruction.

5. Due to new growth—intracranial—meningioma, osteoma; oral, nasopharyngeal—myxoma, chondroma, plasmoma, osteoma; orbital—cavernous angioma, osteoma, lacrimal cylindroma, carcinoma; ocular—from optic nerve and sheath, choroid, retina; metastatic—sarcoma, carcinoma.

6. Due to systemic condition—sympathetic—Graves' disease; endocrinal, malignant exophthalmos; metabolic—scurvy, rickets, *haemophilia*; hyperplastic—leukaemias, xanthomatosis, Paget's disease.

Methods of diagnosis—general exam. history; transillumination; X-ray pictures; blood tests, cytology; special laboratory studies; medical and surgical procedures.

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ANNOTATIONS

Dissatisfied Patients

One of the great problems of medical practice is what to do with our dissatisfied patients. Happy is the practitioner who can truthfully say he never had any. Years ago at a Moorfields' Students dinner Sir Anderson Critchett was in the chair. His health was proposed by Mr. William Lang who said, among other things, that he always wondered what Sir Anderson did with his dissatisfied patients, as he never saw any of them. Sir Anderson refused to be drawn by this blandishment and the juvenile ophthalmologist got no useful tips as to how to deal with this troublesome question. One supposes that each of us in time and with sufficient practice evolves our own methods of dealing with dissatisfied patients. Much depends on the cause of dissatisfaction. Sometimes it is mutual, and then the best

plan is for surgeon and patient to part at once. If, in a moment of aberration, one has ordered a +2·0 sph. for a myope of −2·0 D., no wonder if the latter be querulous. But many cases, indeed most, are not so straightforward as this. If a patient appears to be unreasonable there is, we believe, usually some cause for it apart from the actual ministrations of the doctor. Some people are very hard to please and some would seem to have made up their minds before the examination starts to be troublesome. But often the general health is at fault and if you find evidence of advanced vascular disease in the fundus oculi you will be able to make allowances for asperity of temper and other short comings. A sense of humour helps some people, for there is often something ludicrous in these people's fancies; but it is just as well to keep your fun to yourself unless you know the patient very well indeed.

It seems likely that, under state control, some patients will continue to be dissatisfied; and that a large proportion of the profession will be as well, seems to be as certain as the fact that Mrs. Gamp liked her beer drawn mild. That eminent practitioner would surely have resented interference with her professional liberty and in our mind's eye we can see her consigning the bill to Jonadge's belly along with the Ankworks package.

When we were young a story went round the town of a dissatisfied patient who called on an ophthalmologist of international reputation to say that the glasses which had been ordered were not what he wanted. He adopted rather a truculent attitude and ended up by saying "I'm not satisfied." "Well, I am," retorted the oculist and the patient was dismissed. With *free* treatment for all there will be nothing to prevent a patient from consulting a different doctor every other week. What will be the reaction of those in authority, as the forms come home to their official pigeon holes, when it is found that Diogenes has consulted every doctor from Alpha to Omega in the short period of six months?

OPHTHALMOLOGICAL SOCIETY OF AUSTRALIA

Discussion on Blindness in Prisoners of War

A MEMORABLE meeting was held in Melbourne on May 2 when the Victorian section of the Ophthalmological Society of Australia (B.M.A.) met to discuss the blindness that affected Prisoners of War. Dr. F. G. Fenton was in the chair.

Dr. Robin Orr described the types of disease he had observed and the various conditions with which these could have been associated. A corneal condition referred to as "granular cornea"

caused little serious trouble and cleared up perfectly; 800 Australians had been affected. Great numbers of men, however, developed visual loss similar to that of retro-bulbar neuritis. Dr. Orr examined two thousand affected Australians and about five hundred British and Dutch. As many were examined and tested on numerous occasions some idea of the colossal amount of work done under very trying conditions can be imagined. Detailed reports of most of those patients were still in Dr. Orr's possession.

European food lasted until early in March, 1942. Deficiency diseases, beri-beri, skin and corneal lesions had appeared by June. By July it was realised that not all the visual loss was of corneal origin, and that the nervous tissues were being involved. Most men reported with vision of about 6/9 but some not until it was 6/60. The discs at first showed slight congestion and rarely one or more retinal haemorrhages. Later, unless acuity improved, partial pallor of the discs usually appeared. The fields were mapped out as a rule with 2 mm. white or a 3 mm. red object at 2 metres. Men did not give accurate results until they had been given considerable practice at scotometry.

The incidence reached fifteen cases per thousand per week. As a rule there was a lag of one to two months after a drop in diet before a rise in incidence of visual failure appeared. Occasionally a man whilst on good diet developed " retrobulbar neuritis " and though tobacco excess was unlikely it was found that non-smokers were affected as well as those who smoked heavily. No alcohol was available. Recurrent malaria and dysentery frequently preceded visual failure, but in the first epidemic many had not had either disease. Some mild cases cleared up after a sharp attack of diarrhoea—not dysentery.

No night blindness, scurvy, keratomalacia or Bitôt's spots were found. Captain Woodruff constructed a photomoter and though night blindess was complained of the only genuine case of night blindness found was in a man with retinitis pigmentosa. The first cases were treated with vegemite 2 drachms daily, and rice polishings, from 2 to 3 ounces daily. The latter were contaminated and very unpleasant to take. Many other preparations including grass soup and leaf extracts were given, but mostly in very small quantities. Marmite was used, 2 drachms daily, by the end of September, 1942, with reasonably satisfactory results. Thiamin appeared valueless but it was possible to give only 6 daily injections of 2 milligrammes each. Riboflavin by mouth produced results no better than marmite, but then the patients treated were mainly older ones. The rice polishings contained only one tenth the quantity of riboflavin that was expected.

Dr. Orr discussed the problem of the return of these men to civilian life, and the need for a consideration of their pensions.

Many who might have central vision of 6/9 might not be safe as railway or naval employees. It was the position of the scotomata rather than their extent that mattered. As a rule the scotoma was between the fixation point and the blind spot and usually close to the former.

Dr. Orr showed his original charts prepared at night under difficult conditions and with scrounged and even locally made ink. Whatever was deficient at Changi, it was not grit and determination.

Professor A. W. Mulock Houwer who had been interned in N.E.I. by the Japanese for three and a half years summarised his opinions on the condition that he prefers to call " amblyopia with polyneuropathia." " Camp eyes " was the title given to it during internment. Health was apparently fair until early in 1944 when his camp was moved to the mountains where the cold, the replacement of red by polished rice and bacillary dysentery took heavy toll of the occupants. He was struck by the absence of camp eye amongst children, women and Eurasians. He knew of only one female patient. Middle aged and older men were most affected. There appeared to be an individual susceptibility as a number of internees died from gross deficiency diseases without any visual loss. The onset was usually five to seven months after internment. It often followed an attack of bacillary dysentery. Frequently the patient would complain that one day he noticed he could not recognise his friends, and that this increased for a week or two and then remained stationary. Most of these patients at this time had burning soles to their feet but as knee jerks were always normal and ankle jerks usually so, the neurologists hesitated to diagnose beri-beri.

He was struck by the following fundus changes in nearly all cases: (1) the foveolar reflex was absent more frequently than usual in each age group, (2) a delicate granular appearance at the macula, (3) small yellow and black spots in or near the macula. In some older cases drusen and in a few recent ones haemorrhages were present. In one or two men the drusen were very extensive. In some old cases more or less temporal pallor was present, though in others the disc appeared to be normal. He did not observe any hyperaemia or blurring of the disc.

Professor Mulock Houwer thought that lack of B1 was the chief cause, and that lack of other members of the B group and a poor diet consisting chiefly of carbohydrates were contributory factors. He had seen recent cases recover when given thiamin, but the doses were much greater than those given by Dr. Orr. He advised that patients should be given thiamin and the rest of the B group, especially nicotinic acid. He recommended also a diet that was poor in carbohydrates as the disproportion between intake of much

carbohydrates and little B may play an esential part in causing central scotomata.

Dr. R. B. Maynard spoke of his three and a half years as a P.O.W. in the Changi Camp and gave first hand information of retrobulbar neuritis as he had had the condition. He was surprised to find the " reds " missing in the specimens stained by his technician. His condition responded to marmite. He had been able to keep two specimens of eyes with advanced " retrobulbar neuritis " and several specimens of optic nerves, chiasma, and one whole brain. His report on these was held over until selective staining had been done.

Dr. S. R. Gerstman who is in charge of the " Stonnington " Rehabilitation Centre for blinded P.O.W. discussed the work and conditions there. Fifty-six patients have been admitted and twenty-four discharged for various reasons :—(1) have obtained work commensurate with their poor state of vision. (2) Lack of interest in the work of the centre and being a rather bad influence on other patients. (3) Family worries especially interstate patients, being separated from their families after five years previous separation.

The visual acuity of the thirty-two patients that are there at the moment is (1) up to and including 3/60—10, (2) up to and including 6/60—12, (3) up to and including 6/36—3, (4) better than 6/36—3.

Treatment consists of a very full diet and practically unlimited quantities of fresh eggs, meat, vegetables and fruit. Vitamin B complex in form of marmite and vegemite is always on the table for the use of patients.

With regard to spectacles, some of the patients appreciate a high plus lens (+40) for reading. Others prefer a magnifying glass to read letters and newspapers.

Occupations include gardening, leather work, weaving, pottery and carpentry. There are classes in Braille and touch typing. The chief difficulty is a shortage of trained personnel skilled in teaching the partially sighted.

There is plenty of entertainment inside and outside the centre. Inside, there are wireless, cards and table tennis, at which the patients are quite adept. Outside, there are numerous motor outings, dances and the legitimate stage. Altogether, the patients are very contented, with the exception of some from other states, who naturally feel that after some five years away from their families, another breach is a bit too much to expect of any man. It is this point which is important if there is any future decision about sending these patients to St. Dunstan's. Personally, I am of the opinion that it would be reasonable to send the single men and only those married ones who were enthusiastic enough to realize that their training would be of great importance in their future lives. I do not think any coercion should be used.

Dr. Kevin O'Day thanked the speakers for the papers which bore eloquent testimony to the devotion and skill of the medical officers in the P.O.W. camps in Malaya.

In the routine examination of the repatriated P.O.W's. at Heidelberg Military Hospital, the fields were examined by Major Hughes himself on the Bjerrum screen at two and four metres. There was no evidence of any field defect which might lead one to suspect a lesion in the nerve, that is, there was nothing resembling an arcuate scotoma extending from the blind spot. The most constant finding was a small scotoma just within the five degree circle on the nasal side of fixation with no evidence even with the small objects, of any connection with the blind spot. This scotoma might occasionally extend as a ring encircling the fixation point. At other times, isolated scotomata might be found along this circle. In severe cases there was a dense central scotoma, and the patient was unable to see the fixation mark on the screen. Some would fix with one edge of the scotoma with the consequent shifting of the blind spot across the screen. The edges of the scotoma were shelving.

The appearance of the discs was deceptive. He was not convinced that there was any evidence of atrophy. There was no formation of new tissue on the disc. As many normal cases were seen at the same time with no history of visual impairment, and with normal vision and full visual fields it was possible to compare the observations with normal. Amongst the normal were many cases of " pale discs " and " temporal optic atrophy." It is of course well known that the appearance of the normal disc may vary within wide limits and the speaker did not see any nerve-head which he would be prepared to say was atrophic. It was thought that red free light might be of help in discovering atrophy of the nerve fibre bundles. With the aid of the Physiology and Natural Philosophy departments of the Melbourne University the fundi of normal individuals were examined using the reflecting ophthalmoscope with a direct current arc with large carbons, and with mercury vapour and sodium vapour lamps. Even in the normal, the appearance was so deceptive it was felt that the examination was of no value. The speaker certainly wanted much better evidence than that presented by the red free light. Ophthalmoscopic examination of the central area of the fundus did not reveal anything definite. The absence of a fovealar reflex, to which Dr. Mulock Houwer referred, was looked for. It was found to be absent in many normal individuals, and apparently could not be regarded as a sign of any value. No other appearances were seen in the central area which could be interpreted as being definitely abnormal.

The speaker thought that the lesion could be explained on a

purely retinal basis, and that the lesion was in Henle's fibre layer. Sections cut through the centre of a normal fovea centralis show that a few cone nuclei still remain internal to the external limiting membrane, with an occasional nucleus of a bi-polar cell. The fibres of the cone cells running up to form synapses with the bi-polars are shortest in the centre of the fovea. Going away from the centre the fibres gradually lengthen until they actually run parallel with the limitans for some distance, and it would appear that the longest fibres are those toward the periphery of the fovea. It is well known that Henle's fibre layer is prone to degeneration—in fact it appears to be impossible to fix this particular region successfully when preparing globes for embedding. The speaker suggested that the toxic agent causing the scotoma in these cases might have its first and greatest effect on the longest fibres of Henle's layer, a layer prone to degeneration because of its poor blood supply. As these fibres belong to the cones at the periphery of the fovea, the corresponding field defect is just within the five degree circle.

ABSTRACTS

I.—THERAPEUTICS

(1) **Bloomfield, S. (New York).—The use of tyrothricin, a bacterial extract, in the treatment of marginal ulcers of the cornea.** *Amer. Jl. Ophthal.* Vol. XXVII, p. 500, 1944.

(1) **Bloomfield** comments that the antiseptic effect of tyrothricin is principally due to its gramicidin content. Tyrothricin is prepared from cultures of Bacillus brevis, an aerobic sporulating saprophyte commonly found in sewage and soil. It is a stable mixture of gramicidin and tyrocidine.

The author used drops of tyrothricin suspension in the affected eye every three hours, and tyrothricin ointment in the conjunctival sac at night time. He reports four cases of marginal ulceration of the cornea, resistant to other forms of treatment, which responded quickly to tyrothricin and were healed in 5 to 14 days.

H. B. STALLARD.

(2) **Laval, T. (New York).—Anterior chamber irrigation with sulfadiazine.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 527, 1944.

(2) **Laval** describes the case of a woman, aged 60 years, who vomited after the section had been made in a cataract operation. Gastric contents entered the eye. The anterior chamber and the conjunctival sac were irrigated with sodium sulphadiazine 10 per

cent. The eye showed no reaction to this at any time. Sulphadiazine gr. 15 was given 5 times a day by mouth for 2 days after operation. Healing and convalescence were entirely uneventful.

H. B. STALLARD.

(3) **Dubois-Poulsen.—Penicillin in ophthalmology.** *Ann. d'Ocul.*, Vol. CLXXVIII, p. 81, 1945.

(3) **Dubois-Poulsen** agrees with the current opinion held in England and in the United States, that penicillin is the greatest therapeutic discovery since the sulphonamides, and that it has indeed proved superior to that group of drugs. He reminds us that, in spite of wartime obstacles to the exchange of literature and experience between France and the English-speaking countries, he and other French workers were steadily conducting experimental and clinical investigations upon penicillin during 1943 and 1944.

Having reviewed the now familiar history of Fleming's great discovery, he mentions the main properties of penicillin, the methods employed in its mass production, and the devices by which it is assayed. He points out the ways in which penicillin is superior to the sulphonamides, and proceeds to consider its mode of action. He goes on to remark that the systemic administration of this drug within the customary limits of dosage does not secure an adequate penicillin-content in the ocular media. Among the local methods of applying penicillin, subconjunctival injection of 2,500 units, accompanied by 2 per cent. novocaine, is singled out for praise. The author emphasises, however, that parenteral administration should supplement these local injections if the *posterior* segment of the globe is infected. The introduction of penicillin into the anterior chamber is also mentioned as a suitable means of combating deep infections of the globe.

J. H. DOGGART

II.—RETINA

Laval, T. (New York).—Coats's disease. *Amer. Jl. Ophthal.*, Vol. XXVII, p. 163, 1944.

Laval describes the pathological findings in the eye of a child, aged 10 years. Macroscopically the bisected globe showed occlusion of the filtration angle in the 7 o'clock meridian by a broad anterior synechia and posterior to this the retina was considerably thickened between the ora serrata and equator. The microscope showed marked proliferation of pigment on the anterior surface of the iris. In the affected area of the retina there was much connective tissue. "Goblet" cells were seen in the layer of destroyed rods and cones.

Clumps of pigment and perivascular lymphocyte infiltration were also present. Drusen bodies were seen in the lamina vitrea.

The author comments that in some cases vascular and haemorrhagic features are pronounced whereas in others these are minimal and inflammatory exudation and organization are more prominent. In discussing the pathology of Coats' disease the author says that "it may be stated that Coats' disease depends primarily on changes in the retinal arterial system."

H. B. STALLARD.

III.—MISCELLANEOUS

(1) **Nicholls, John V. V. (Montreal).—A survey of the Ophthalmic Status of the Cree Indians at Norway House, Manitoba.** *Can. Med. Assoc. Jl.*, April, 1946.

(1) Nicholls gives the results of a survey of 300 Cree Indians within reach of Norway House in the Spring of 1944. The work was done between March 15 and 22. The land here is relatively unfertile, and the Indians are engaged mostly in hunting and trapping. Exposure to the rigour of the climate and deficiency in fresh vegetables, dairy products and meat are the rule. Some of those adults examined had been using vitamin supplements for the previous one to two years as a result of a nutrition study.

Of those under 18 years of age 59 were male and 58 female. Of the older cases 103 were male and 70 female. Pterygium was the commonest abnormality to be found. No case was found in the group under 18 years of age. One case was observed in a youth of 18 and another in one of 19. Thereafter the condition increased in frequency. Pingueculae were not found in the first decade of life, but became more frequent in the second decade, and practically universal thereafter. The author found that visual defects were twice as common in the older group than among the children of school age. Fourteen patients had <6/60 in one or both eyes. In three cases this was bilateral. In six cases dense corneal scars were the cause, four of which were due to lime burns. (The Cree Indians usually whitewash their houses). There were six cases of cataract, and one each of phthisis bulbi, strabismus, pigmented macular degeneration, primary optic atrophy and anterior staphyloma. There is a relatively high incidence of tuberculosis among these people. Active phlyctenular keratitis was found in two cases, and inactive in four, six in all.

The author states that those examined had basically good eyes and vision, but as age increases this picture changes owing to the effects of ocular disease.

R. R. J.

(2) **Livingston, P. C. (London).—The form and character of rod scotometry.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 349, 1944.

(2) **Livingston** describes the technique of scotopic scotometry using self-luminous test objects of radium paint treated with varnish, their sizes being 1, 2·5 and 5 mm. and their luminosity between 6×10^{-9} and 40×10^{-9} candle power. The fixation light is a 1 mm. pencil shining through a deep-red filter approaching Wratten 89A. The test is confined to the 30 degree field on Bjerrum's screen at 1 metre.

There is normally a central egg-shaped scotoma within a circle of 2 to 3 degrees of the fixation spot, its major spread lying in the horizontal axis. The blind spot is always larger than that recorded in daylight and there is a scotoma in the upper part of the field 23 degrees from the fixation point. This is triangular in shape with its apex pointing down.

A contraction of the field with enlargement of the macular scotoma and blind spot is found in anoxaemia. The author illustrates by visual field charts defects found in vitamin A deficiency and diabetes. It is evident that by this technique central field defects will be revealed more readily and earlier than by the customary procedures.

H. B. STALLARD.

(3) **Thornhill, E. H. and Anderson, B. (Durham, North Carolina).—Extradural diploic epidermoids producing unilateral exophthalmos.** *Amer Jl. Ophthal.*, Vol. XXVII, p. 477, 1944.

(3) **Thornhill and Anderson** report a case of a rare tumour, an extradural diploic epidermoid affecting the roof of the left orbit and causing unilateral exophthalmos. This tumour arises from epithelial cell-rests, which remain quiescent in early life and for some reason become activated at maturity. X-ray examination shows a sharply defined, dense, white, scolloped margin. The author's patient was a white female, aged 24. The neoplasm was clinically and pathologically like a cholesteatoma. The inner table of the skull was eroded and the dura intact. There was no connection between the neoplasm and the accessory sinuses. The neoplasm was removed through the supra-orbital approach.

H. B. STALLARD.

(4) **Reese, A. B. and Khorazo, D. (New York).—Endophthalmitis due to *B. subtilis* following injury.** *Amer. Jl. Ophthal.*, Vol. XXVI, p. 1251, 1943.

(4) **Reese** and **Khorazo** report the case of a farmer, aged 56 years, with an intra-ocular foreign body in the right eye the result

of chiselling a horse's shoe. He developed endophthalmitis. From the aqueous and vitreous there was grown a Gram-positive bacillus, isolated under aerobic conditions, whose cultural and morphological characteristics identified it as a member of the B. subtilis group. The organism was not pathogenic for guinea pigs, but induced endophthalmitis when injected into the anterior chamber of a rabbit's eye. An injection of a sample of the patient's vitreous into a rabbit's eye produced a vitreous abscess.

H. B. STALLARD.

(5) **Kranitz, D. (Brooklyn) and Duest, L. T. (New Bedford, Massachusetts).—Post-operative endogenous infection of the eye with recovery.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 167, 1944.

(5) **Kranitz** and **Duest** report two cases of post-operative endogenous infection of the eye which ended satisfactorily. In one case infection was evident on the fourth day after a cataract operation. Sodium sulphathiazole solution 5 per cent. was instilled 2 hourly. One day later sulphadiazine gr. 15 was given 4 hourly for 6 doses and then 7½ gr. 4 hourly. On the 10th day after operation the inflammatory changes began to decrease. Three months later after division of some organized inflammatory membrane in the pupil and anterior chamber the patient recovered 20/40 vision.

In the second case, also a cataract extraction, vitreous was lost. Post-operative inflammation appeared on the fifth day. He was treated by intravenous typhoid injections of 5, 10, 15 and 50 millions and sulphathiazole gr. 60 daily was given until the twentieth day. On the fourteenth day 10 c.c. of sterile milk were injected intramuscularly and this was given daily for the next 8 days. After discission vision recovered to 20/10+.

The authors comment that post-operative endogenous infection is more likely to occur after severe or prolonged operative trauma.

H. B. STALLARD.

(6) **Stewart, R. A. (Baltimore).—The use of naphthocaine as a local anaesthetic in ophthalmology.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 178, 1944.

(6) **Stewart** commends naphthocaine (mono-hydrochloride of betadiethylaminoethyl ester of 4 amino-1-naphthoic acid) as a local anaesthetic in ophthalmic surgery. It is soluble in distilled water, making a clear, pale yellow solution with a pH of about 4·4. There is little difference between the anaesthetic properties of 0·3 per cent. and 1·0 per cent. Anaesthesia is immediate. The author maintains that it is superior to procaine in that its effect abolishes pain when the superior rectus stitch is inserted and when an iridectomy is

done. Akinesia is excellent, and it has the advantage of delaying post-operative pain for 8 to 10 hours. No toxic symptoms have been reported to-date. It is used by instillation and injection.

H. B. STALLARD.

(7) **Kronfeld, P. C. and McGarry, H. I. (Chicago, Illinois).—Present limits of gonioscopy.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 147, 1944.

(7) **Kronfeld** and **McGarry** discuss the value of gonioscopy as offering a simple mechanical explanation for certain cases of glaucoma. It may be helpful in choosing the type of operation suitable for the case under consideration, and in showing the causes of failure of glaucoma operations. It is of prognostic value in affording information about the state of a filtering cicatrix.

However, gonioscopy offers no explanation of the mechanism of certain types of glaucoma.

H. B. STALLARD.

(8) **Sugar, H. S. (Vancouver, Washington).—Tarsoconjunctival sliding-graft techniques for eyelid reconstruction.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 109, 1944.

(8) **Sugar** describes with the aid of diagrams 8 methods of reconstructing defects in the eyelids, after trauma and excision of neoplasms, in which the surgical principles involved in closing the coloboma or repairing an almost total lid loss are as follows. (1) Splitting of the lid substance into two layers (*a*) skin and orbicularis muscle and (*b*) tarsus and conjunctiva. The latter was sutured to the edges of the coloboma and the former slid down into position where this was possible or alternatively (2) the skin defect was filled in by a sliding flap assisted by the excision of Bürow's triangles, a free-skin graft or a pedicle. (3) A free hair-bearing graft was used to reconstruct a line of lashes. This was taken from the opposite eyebrow. (4) At a later date the palpebral fissure was reformed by cutting through the full thickness of the reconstructed lids.

H. B. STALLARD.

(9) **Flick, T. T. (Indianapolis, Indiana).—Tumour of the lacrimal gland.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 362, 1944.

(9) **Flick** describes the case of a lacrimal gland tumour, epithelial in type, which showed much pleomophism. On several occasions the proptosed eye had been dislocated through the palpebral fissure and the eyelids had closed behind the eye. A general anaesthetic was necessary to replace the eyeball. Removal of the neoplasm was attempted through a transfrontal approach. The roof of the orbit was eroded. Three-quarters of the neoplasm was

removed. Proptosis and diplopia disappeared. The patient declined exenteration of the orbit and X-ray therapy. His condition was satisfactory 1½ years after operation.

H. B. STALLARD.

(10) **Folk, M. R. (Chicago).—Optic nerve atrophy in malignant nasopharyngeal tumours.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 373, 1944.

(10) **Folk** describes two cases of optic atrophy associated with a malignant naso-pharyngeal neoplasm. The first case was a transitional-cell carcinoma in a 30 year old white woman and the second a spindle-celled sarcoma in a child, aged 5 years. The latter died.

Optic atrophy seems to have occurred as a result of compression of the nerve and not infiltration. The dural sheath of the optic nerve as well as the periosteum of the orbit and the dura is more resistant to malignant neoplastic infiltration than bone tissue.

H. B. STALLARD.

(11) **Anthony, E. W. and Marshall, D. (M.C., A.U.S.).—Erythema nodosum episcleritis.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 398, 1944.

(11) **Anthony** and **Marshall** report a case of erythema nodosum episcleritis which affected the interpalpebral bulbar conjunctiva on the nasal and the temporal sides in both eyes. The lesions consisted of several small, raised, yellowish nodules surrounded by deep redness fading into a pink and then a slight bluish flush. The largest nodule was 1·5 mm. in diameter. These nodules were slightly tender.

H. B. STALLARD.

(12) **Schoenberg, M. T. and Posner, A. (New York).—A report on defects found in tonometers examined at the checking station of the National Society for the Prevention of Blindness.** *Amer. Jl. Ophthal.*, Vol. XXVII, p. 368, 1944.

(12) **Schoenberg** and **Posner** discuss the major and minor defects discovered in tonometers sent by ophthalmologists in 17 different states and Canada. Among the major defects the weight of the plunger, load and lever was either too high or too low in 80 per cent. The weight of the entire tonometer was not according to standard in 29 per cent. and the radius of curvature of the testing block was incorrect in 80 per cent. The lever ratio instead of being 1 : 20 was defective in 61 per cent.

H. B. STALLARD.

CORRESPONDENCE

A NEW OPERATIVE PROCEDURE FOR GLAUCOMA

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

DEAR SIRS,—Since May of this year, I have been experimenting with a novel operation for glaucoma, to which I gave the name of "cyclanaemisation." I have had already some encouraging results, but neither the technicalities of the operation, nor the experiences are ripe for publication.

In consequence of hindering circumstances it is only now that I could obtain the latest numbers of the *Arch. of Ophthal.* There I read in an article of Roetth (p. 21), that Guerry invented an anti-glaucomatous operation called angiodiathermy in 1944, based on the same principle on which my proceeding was worked out, namely on the coagulative obstruction of the long posterior ciliary arteries.

Nevertheless there is a not unimportant difference between his and my operation. As far as I can infer from the short remarks of Roetth, Guerry coagulates one of the named arteries just anterior to its entrance into the sclera. He seems to have got convincing experimental evidence, that atrophy of the eyeball follows simultaneous coagulation of both vessels.

Contrarily to his proceeding I am obstructing the long ciliary arteries behind the insertions of the horizontal recti, partly by pergamentisation, partly by perforating cauterisation. The muscle is exposed on a squint-hook and drawn to the side by a glass retractor, thus the scleral operating field is made well accessible. The operation performed on both sides of the same eye I have seen only mild atrophy of the iris with pigment-mobilisation. Very expressed and durable hypotony ensued sometimes. Serious damage of the eye has up to now never been observed.

It is probable, that Guerry or somebody else, in prosecuting the mentioned basic principle will find out earlier or later this right and simple way of anaemising the ciliary body. Therefore I beg you to publish these lines as a short preliminary note.

Yours truly,

A. KETTESY, Professor.

UNIVERSITY EYE CLINIC,
DEBRECEN, HUNGARY.

NOTES

Honour

SIR STEWART DUKE-ELDER has been elected an honorary member of the American Ophthalmological Society and was recently presented with the Howe medal.

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Appointments

MR. J. MINTON has been appointed a Hunterian Professor at the Royal College of Surgeons for the year 1947. He will lecture on "Occupational Eye Diseases and Injuries," at a date to be announced later.

DR. SYDNEY TIBBLES has been appointed Eye Surgeon to the Kent County Council, for clinics at Beckenham and West Wickham; also to the London County Council for clinics at Hammersmith.

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American Ophthalmological Society: Officers 1946-47

President, J. W. Burke; *Vice-President*, H. C. Haden; *Secretary-Treasurer*, W. S. Atkinson; *Editor of the Transactions*, W. E. Fry; *Council*, L. T. Post, E. L. Goar, F. C. Cordes, J. A. MacMillan, Derrick Vail; *Committee on Theses*, G. Dvorak-Theobald, Conrad Berens, J. N. Greear, jun.; *Programme Committee*, The President, Secretary-Treasurer and T. L. Terry.

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National Society for the Prevention of Blindness

A three-day Conference will be held on November 25, 26 and 27, 1946, at the Hotel Pennsylvania, New York.

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Illuminating Engineering Society; "I.E.S. Code"

THE Illuminating Engineering Society have now reprinted the "I.E.S. Code (published in its original form in 1936) for the Lighting of Building Interiors." The 1945 edition contained several important new features, namely the provision of a scientific background on which values of illumination are based, the inclusion for the first time of information on natural lighting and the introduction of clauses relating to quality of lighting (absence of glare, etc.). The new edition now available is essentially the same as the 1945 edition, embodying only minor alterations of layout. Copies may be obtained, price one shilling and sixpence, from The Illuminating Engineering Society, 32, Victoria Street, London, S.W.1.

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U.N.R.R.A.

COMPLETE sets of General and Specialist Medical and Nursing Journals from 1939-1945 are urgently needed by U.N.R.R.A. for distribution in European countries. They should be sent to Dr. Hadaway, Room 1934, Health Division, U.N.R.R.A., 19, Portland Place, London, W.1.